

May 1933

TECHNOLOGY REVIEW



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Something to Say

—not just saying something



A friend of CHESTERFIELD writes us of a salesman who had "something to say":

"I dropped into a little tobacco shop, and when I asked for a pack of Chesterfields the man smiled and told me I was the seventh customer without a break to ask for Chesterfields. 'Smoker after smoker,' he said, 'tells me that Chesterfields click . . . I sell five times as many Chesterfields as I did a while back.'"

Yes, there's something to say about Chesterfields and it takes just six words to say it—"They're mild and yet they satisfy."



they Satisfy

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THE TABULAR VIEW

WHAT H. G. Wells calls "a sense of state" is an attribute that is becoming, happily, more common in the engineering profession, but it is not yet common enough, as Dr. C. F. Hirshfeld so convincingly points out in the leading article in this issue. The Review welcomes an opportunity to present a discussion of the engineer's place in a democratic society by so important an engineer as Dr. Hirshfeld. He is Chief of Research at the Detroit Edison Company, and prior to affiliating himself with that company in 1913, he was professor of mechanical engineering at Cornell. He received his bachelor's degree from the University of California, his master's degree from Cornell, and the honorary degree of doctor of engineering from Rensselaer Polytechnic Institute. His recent appointment to the chairmanship of the Engineers Council on Professional Development (see The Review for January) is an earnest of his interest in the problems of the engineering profession. Dr. Hirshfeld's citation at Rensselaer last June was as follows: "Eminent as an educator, engineer, investigator, and author, a guide and counselor in many fields, a leader in the application of science, the director of a great research laboratory, and an illuminating contributor to the literature of his subject." ¶ In a notable article published in the November, 1930, Review, Stuart Chase, '10, aptly described the engineering mind about which Dr. Hirshfeld writes. "It is a mind," wrote Mr. Chase, "that is professional, not commercial; dedicated to building, not profit-making; that is done with false modesty and has the courage to accept the job of taming the billion wild horses which Watt let loose; that thinks straight and hard; hates waste and confusion, dirt and despair; that never stoops to the shoddy or the adulterated; that builds clean and strong for the greater glory of mankind."

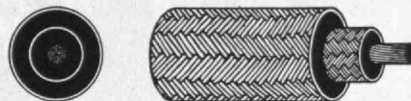
AS DEAN of the Graduate School and as a Professor of Physics and Electrochemistry, Dr. Harry M. Goodwin, '90, is in a position to write intimately of Technology's Department of Physics. Immediately after graduation, he began his teaching as an assistant in that department. The following year he was appointed an instructor, in 1897 an Assistant Professor, in 1903 an Associate Professor, and in 1906 a Professor. In 1892 he was granted leave of absence for study abroad and was awarded the degree of doctor of philosophy from the University of Leipzig in 1893. The following winter he studied at the University of Berlin. ¶ Daniel C. Sayre, '23, is well known to Review readers as a former contributing editor. While he was Assistant Professor of Aeronautical Engineering at M. I. T., he piloted the daily flights of Technology's "flying laboratory."

READERS of The Review are reminded that there will be no June issue. The next and last issue of this volume will be the July issue, which will be in the mails on June 27.



High Tension Wires of Improved Construction

Interlayer Braid in the wall of rubber insulation



U. S. Patent No. 1458803

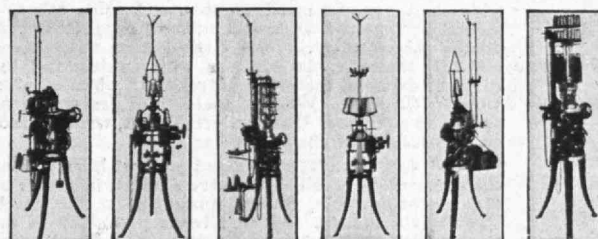
Advantages

1. Increases dielectric strength with the result that the breakdown voltage is appreciably higher.
2. The safe working voltage is increased. With this construction cables can be manufactured with rubber insulation to withstand 75,000 to 100,000 volts.
3. Much more reliable against entire failure in case of damage to outer portion of the insulation.

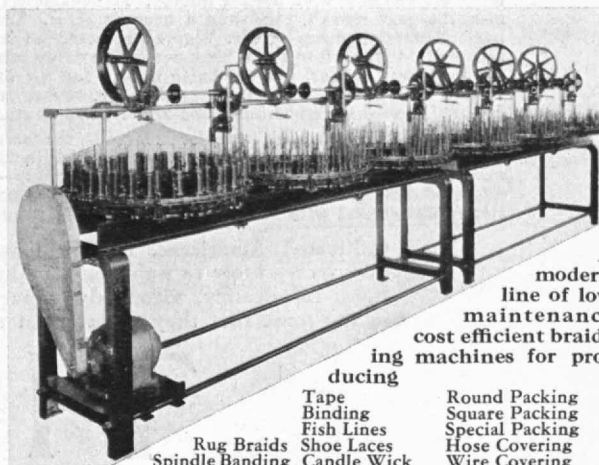
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The Painless Operation



... High up under the dome of Boston's Massachusetts General Hospital, far removed from the wards so that the screams of sufferers under the knife will not horrify the ward patients, is the Hospital's famed operating amphitheatre. Many a medical student dreads the operations he is privileged to watch, frequently faints. But one day last week Dr. John C. Warren, Boston surgeon, led a group of surgeons and students (class of 1847) up the long stairs, eager, hurrying.

For there beckoned an interesting experiment—surgery without pain. Dr. William Thomas Green Morton, 27-year old Boston dentist, thought it possible, had experimented to that end with ether, a volatile, pungent chemical compound capable of producing insensibility. He had tried it on animals, on himself, then on his patients while extracting the roots of decayed teeth. Finally he had obtained permission from Dr. Warren to let him test his drug before an audience. One Gilbert Abbott, with a tumor on his neck, was to be the first trial.

At 11 a.m. the last privileged student hurried into the amphitheatre. Experimentee Abbott, fidgeting on the operating-table, looked anxiously at the clock. Casual talk ceased, sudden silence prevailed as the minute-hand crawled past the hour, and Dr. Morton did not appear. "He and his anesthetic! Humbugs both, no doubt!" mumbled a doctor. It became five minutes past eleven, ten, then a quarter after. The patient stirred uneasily, Dr. Warren selected an instrument, advanced to the table—useless to delay proceedings any longer. As his knife poised for the incision, Dr. Morton, breathless, apologetic, rushed in. He held in one hand a curious globe-and-tube apparatus.

In eager concentration, tensely expectant, the waiting group of surgeons and students watched while the newcomer—a charlatan perhaps, a genius possibly—adjusted his peculiar inhaling apparatus to the patient's mouth and with tense composure administered

his anesthetic. Veiled skepticism revealed itself when the patient reacted suddenly in wild exhilaration, but this exuberance subsided, relaxation took its place, then unconsciousness. Skepticism was routed, amazement paramount. Said Dentist Morton to Surgeon Warren: "Your patient is ready."

Dr. Warren began to operate, proceeded quickly, in five minutes had finished. From the patient came no cry of pain, no agony of distress, only slight movements, mumbled words as from one who stirs on the borderland of sleep....

"This, gentlemen," exclaimed Surgeon Warren. "is no humbug."

Awake, Gilbert Abbott said, "I felt no pain."

So, in part, had TIME been published in October, 1846, would TIME have reported the first public demonstration of ether as a surgical anesthetic. So, too, would TIME have reported how one Dr. Crawford Williamson Long, of Georgia, came forward later saying that he had used ether four years previous, had given it up as impractical.... So, too, would TIME have reported the bitter persecution that came to Dentist Morton when he patented his discovery as "Letheon"; the seizure of "Letheon" by the U. S. Government for its own uses; the claims of Dr. Charles T. Jackson, the Boston chemist from whom Dentist Morton had obtained his ether; the division of the Paris Academy of Medicine's 5,000 franc Monthyon Prize for 1852 between these two, with Morton proudly refusing his share; the long Congressional investigations resulting in nothing, and Dentist Morton's death in poverty in 1865.

Cultivated Americans, impatient with cheap sensationalism and windy bias, turn increasingly to publications edited in the historical spirit. These publications, fair-dealing, vigorously impartial, devote themselves to the public weal in the sense that they report what they see, serve no masters, fear no groups.

TIME

The Weekly Newsmagazine

YEARLY SUBSCRIPTION \$5 : 205 EAST 42nd STREET, NEW YORK CITY : 15 CENTS AT ALL NEWSSTANDS

G-E Campus News



IN A PADDED CELL

RESearch moves in devious ways its wonders to perform. G.E. has a padded cell in its general engineering laboratory at Schenectady—for the isolation of extraneous sounds. Confined in it, at intervals, are motors, fans, and other equipment which serves best when heard least. The cell is a room within a room. The outer wall is of sound-absorbing plaster; then come hollow tile, air space, felt, another layer of plaster, more air space, sheet iron, air space, lathwork, and a thick layer of cotton waste. Total thickness, a foot and a half. Within the chamber a “noise meter” tracks down outlawed decibels.

Last year, the noise meter left its padded cell and traveled to Manhattan’s Metropolitan Opera House. Ensconced in a grand tier box next to that of Manager Giulio Gatti-Casazza, it measured voices, orchestra, and applauding hands while “Rigoletto” was sung. The meter discovered that Beniamino Gigli registered 77 decibels,—a street car in full progress makes only 65. Laboratory devices do have their big moments.



FORE!

“WOW! What a drive! If I could hit ’em like that, I’d sure break a hundred.” Just a few comments as a national driving champ smacked a golf ball out of sight. Occasion—the demonstration of a new G-E device for measuring speeds heretofore not measurable because of their nature. The apparatus registered the speed of the champ’s club head at 125 miles per hour; an average player is lucky to register 70. No wonder the champion can hit them so far.

The ball is driven from a low platform. Just back of the ball, two parallel beams of light are at right angles to the path of the club head. Each beam hits an “electric eye” or photoelectric tube. A split second before striking the ball, the driver cuts the first

beam, and almost immediately afterwards cuts the second beam. Both phototubes operate Thyatron tubes, the first one causing a condenser to begin charging and the second one stopping it. The charge is measured by a meter which is calibrated in terms of miles per hour.

And don’t worry about swinging too fast. H. W. Lord, who perfected the apparatus, says it will measure speeds up to about a thousand miles per hour. What a drive that would make! Incidentally, Lord is a ’26 grad of the California Institute of Technology.



“A CENTURY OF PROGRESS”

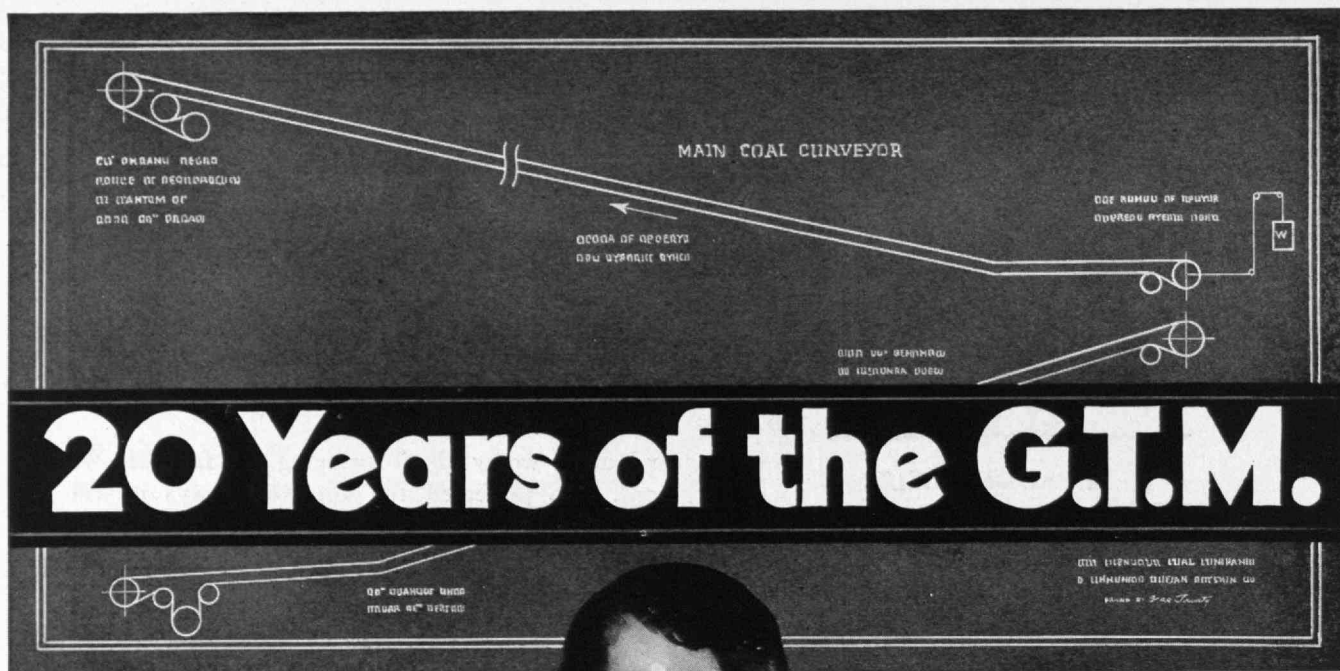
THIS summer, if you go to Chicago, you will visit an Aladdin fairyland; “A Century of Progress” will be the greatest night exposition ever held. You will see a veritable aurora borealis, artificially produced. Walter D’Arcy Ryan, veteran G-E illuminating engineer, is working in Chicago to help make the exposition the most spectacular ever seen. And well qualified for the job he is. An engineer-artist—schooled at St. Mary’s, in Halifax—he has directed the illumination for many similar events. When you go to Chicago, you will agree that a masterpiece has been created.

And you should not miss the G-E “House of Magic,” the most amazing part of the General Electric display at the exposition. There, recent discoveries and developments of our Research Laboratory will be presented in a fascinating manner. “Bill” Gluesing, a ’23 grad of the U. of Wisconsin, will have charge of the lectures and demonstrations. In addition, many G-E machines and appliances in the great circular hall of the electrical building will dramatize the rapidity of electrical progress. We’ll see you at the exposition. Remember, it’s from June 1st to October 31st.



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GENERAL ELECTRIC



JUST exactly twenty years ago last month Goodyear established the Goodyear Plant Analysis Plan for the better equipment of industry, and entrusted the specification of that equipment to the expert hands of the G.T.M. — Goodyear Technical Man.

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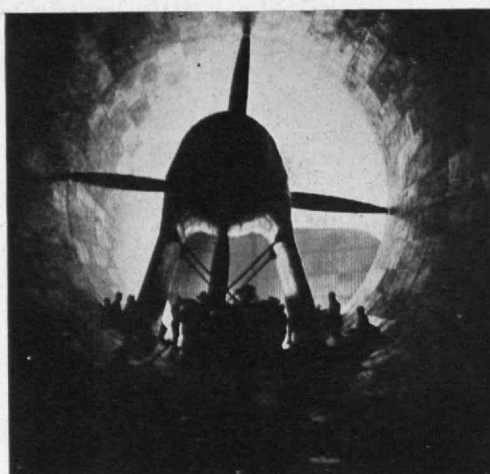
operations of literally thousands of small installations where Goodyear Mechanical Rubber Goods are the standard specification.

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Carl Wahlström

Inside the huge full-scale wind tunnel at the Langley Memorial Aeronautical Laboratory, Langley, Va.,—the great center of research established by the National Advisory Committee for Aeronautics

THE TECHNOLOGY REVIEW

A NATIONAL JOURNAL DEVOTED TO SCIENCE, ENGINEERING, AND THE PRACTICAL ARTS

Edited at the Massachusetts Institute of Technology

VOLUME 35

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J. RHYNE KILLIAN, JR.

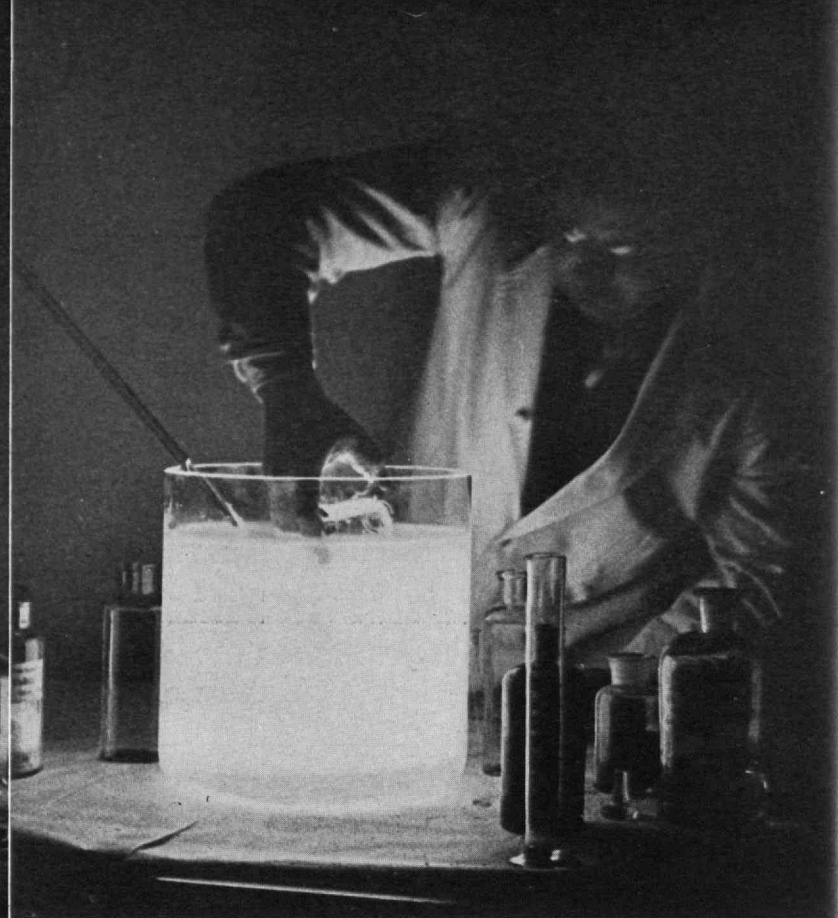
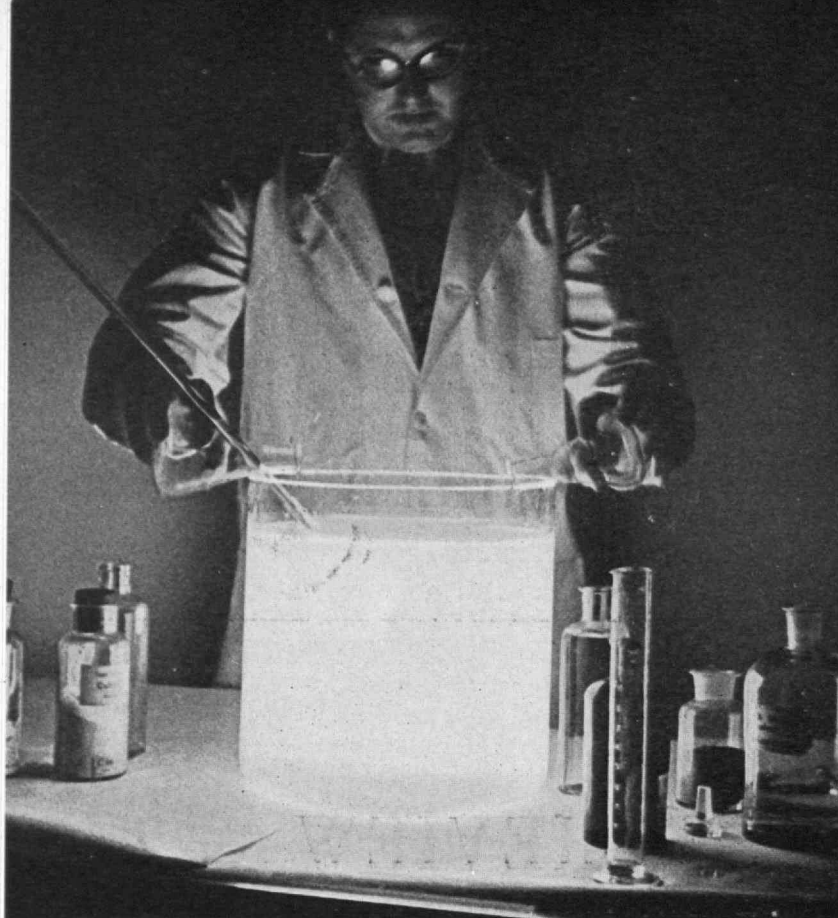
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Photographs by C. M. Wareham '16

Liquid Light

A startlingly beautiful demonstration of chemiluminescence — the production of visible light by chemical reaction occurring at relatively low temperatures — has been devised by Assistant Professor Ernest H. Huntress '20 of the Institute's Department of Chemistry. The accompanying pictures of this experiment were taken in an otherwise completely dark room by means of the visible light given out by the chemical reaction taking place in the jar. This reaction involves the oxidation of an organic compound (called "luminol" by Professor Huntress) induced by a mild alkaline oxidizing agent. In the experiment shown in these pictures, the concentration of "luminol" is approximately 0.006%.

A familiar example of chemiluminescence (see page 295) is the slow oxidation of phosphorus, which produces a very feeble, pale light. It was this phenomenon which gave rise to the term phosphorescence. Many examples of bioluminescence, or light produced by living organisms, are known, including luminous marine organisms and certain fish. Many organic compounds are known to oxidize with resulting production of light but, in most instances, light intensity is very small and is often perceptible only with difficulty. In the experiment of Professor Huntress, however, the light is relatively bright and may be observed even in daylight.

Unlike ordinary incandescence, radiation from this reaction is given off at low temperatures. In the picture above on the right, this is graphically demonstrated by the piece of ice which is being removed from the solution. At the dilution employed in this experiment, there is no perceptible heat effect during the reaction.

The light given off is bluish white in color, but it may be modified under certain conditions. Radiation continues only so long as the solution is alkaline and the duration of the chemiluminescence is a function of its intensity and of the conditions prevailing in the solution.

The study of chemiluminescence and related phenomenon is one of the projects being carried on in the research laboratory of organic chemistry at M. I. T. A public demonstration of the experiment shown here was given by Professor Huntress before a meeting of the Northeastern Section of the American Chemical Society at the Institute on April 29 — a meeting held in conjunction with the dedication of the George Eastman Research Laboratories of Physics and Chemistry.



Photograph by E. A. Averill

THE TECHNOLOGY REVIEW

Vol. 35, No. 8



May, 1933

Straight Thinking

How the Engineer Can Improve Democratic Government

BY C. F. HIRSHFELD

DURING the time that America's comparatively young democracy has been in existence a very sweeping change has occurred in human affairs. Practically all of what we call modern science has been developed and out of it has come an industrial culture which we have grafted upon an earlier and more natural civilization based fundamentally upon agriculture. When asked how this thing has come about the average person would undoubtedly attribute it to scientific discovery and to invention. I think we can be more fundamental in answering such a question. To me it has come about through the intensive application of a new method of thought, what we define grossly as the scientific method.

This method is characterized by requiring proof of each step that is taken mentally. Past teachings, traditions, precedents, convictions are not sacred; they are accepted only so long as they stand the test of the most rigorous experimental proof that can be devised. Just as soon as any one of them fails to meet such test it is unceremoniously dumped overboard to make room for its successor. The process is a rigorous, unsentimental sort of a thing but it does produce results. It represents the straightest sort of thinking that mankind has yet indulged in for the simple reason that it does not trust his intelligence beyond the last experimentally proven step in the thought process.

**CAN DEMOCRACY BE SAVED FROM
SELF-DESTRUCTION BY APPLYING
THE ENGINEERING METHOD TO
SOCIAL, ECONOMIC, AND POLITICAL
PROBLEMS?**

The scientist has used this method with wonderful success in uncovering the workings of the universe in which we have our existence. He expends his energies in uncovering truth for truth's sake. In general he has no particular interest in or concern for useful applications which may be made as a result of his discoveries. To him the discovery is the all sufficient aim and end. In one sense he is the great idealist of our present culture.

Other more materialistically minded individuals, however, have taken his products and by using his methods have succeeded in greatly changing the conditions of our lives. An outstanding group among these more practically minded individuals is that of the engineers. These men appropriate the results of the work of the scientists and apply them to the satisfaction of human desires of one sort or another. Their problem is more complicated than that of the scientist because of many limitations under which they work. These are partly economic in character, but limitations are also set by the characteristics of available materials and by such apparently extraneous things as individual and mass psychology.

Like the scientist, the engineer must start from proven facts and must think very clearly toward the next provable step. Unlike the scientist, he cannot always obtain all the necessary facts with which to start and he is also frequently confronted with the necessity of constructing

before proving the correctness of all the underlying steps of his reasoning process. Further, he generally departs rather early in his problem from the simple consideration of the inexorable laws of Nature and wanders through various fields of approximation and compromise. His problem is indeed a difficult one. And yet we have engineers in abundance who do succeed in picking their ways safely through such poorly charted or even uncharted fields. We do have engineers who succeed in building upon the clean-cut and clearly stated laws of science the practical structures which make proper allowances for the idiosyncrasies of commercial materials, pertinent economic limitations, and the ever-changing viewpoints and tastes of humanity.

Fundamentally his method requires that conclusions be based primarily upon proven fact and secondarily upon logical and, if possible, proven deductions therefrom. It is distinctly impersonal. It is directly opposed to emotional, traditional, partisan, and selfish methods. For want of a better comprehensive description I call it straight thinking for that is, in the ultimate, exactly and completely what it is.

It has always seemed strange to me that the engineers should be the only large group that has extensively adapted the methods of the scientists to the purposes of its own business. And, it has also always seemed strange to me that this group should, in general, have been satisfied to confine such rigorous and practically profitable thinking to problems of what we commonly call an engineering nature. I have been particularly impressed by the way in which most engineers slough off their carefully developed training and join the unthinking, whimsical mob when it comes to a consideration of political questions.

I have thought for a long time that if engineers could be made to apply their methods in the personal consideration of many of the problems of a nonengineering character with which we people of the world wrestle more or less impotently and if in addition they could be made articulate in such matters, they could and would supply the leaven of straight thinking that is so badly needed in modern life. I firmly believe that along such a route lie the means of so altering the conduct of democratic government as to save it from self-destruction and to make it attain at least to some of the heights that its idealistic advocates believe it capable. Barring an infusion of straight thinking from this or some other similar source I fear that our democracy and the other democracies of the world must ultimately give place to forms of government in which the great majority, instead of directing, is directed.

LET us consider just a few examples of very curious and seemingly crooked thinking that threaten unfortunate results. We may well start with the agricultural situation since it is at the present minute much in the public eye. For years we have paid taxes to our state and federal governments to support them in the development of new species and new methods capable of increasing greatly the yield per acre of agricultural land. At the same time we have also paid the Federal Government taxes for the purpose of making it possible to bring marginal land under cultivation, principally

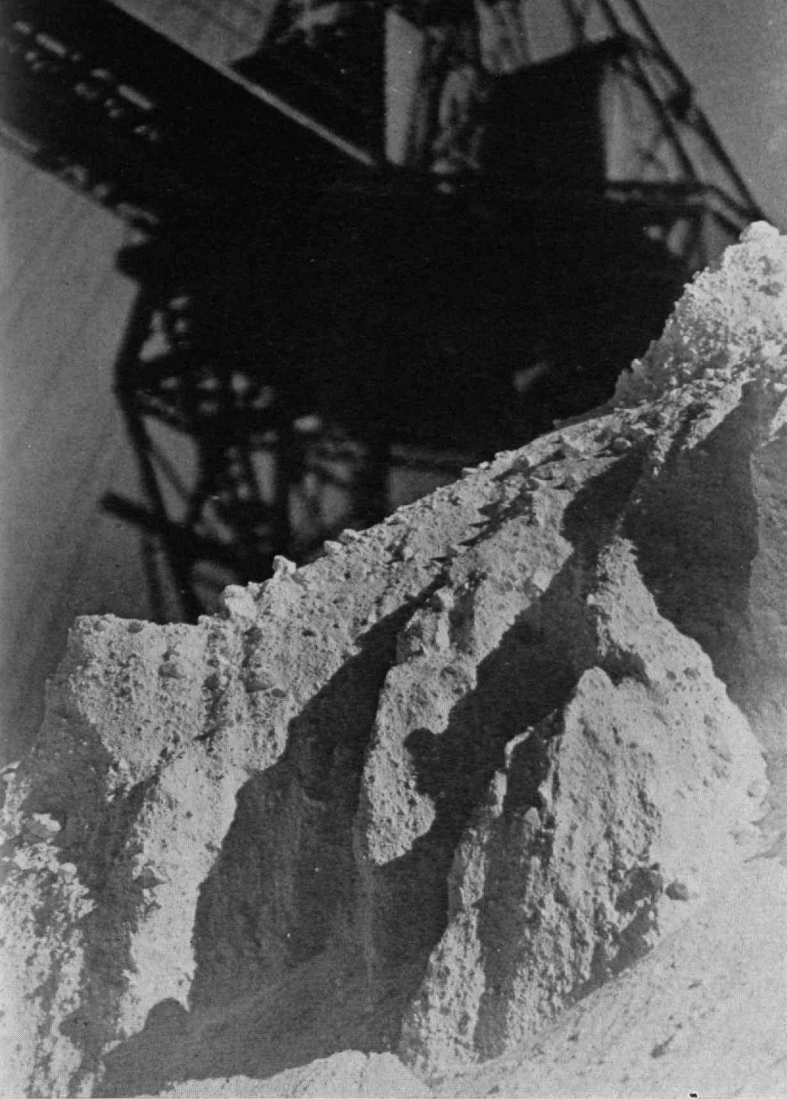
through provisions for irrigation. During the same time we have paid taxes to cover studies into the reasons why farmers were leaving the farms. Recently we have spent huge sums in attempting to maintain fictitiously high prices for certain farm products. Now our national law makers are engaged in discussing further strange and curious means intended to do the same thing. Having paid good money to put us in position to produce in excess of the demand, we are now engaged in what is equivalent to an attempt to repeal the law of supply and demand.

It does not appear to have occurred to anyone that straight thinking in connection with such matters requires that some balance should be struck between the total usable quantity of agricultural products and the expectable yield from existing lands with the improved stocks and improved methods, before we could justify the expenditure of public funds for increasing available acreage by bringing in lands of marginal character. It does not appear to have occurred to anyone that straight thinking requires that some balance be struck between the money expended for developing such new stocks and methods and the economic value of the results.

There are many other aspects of this very large problem, such as the effects of modern refrigeration and modern transportation methods. But, even if we ignore these, it is patent that we have been guilty of very loose thinking. I might almost say absence of thought, with respect to certain very fundamental matters. All human experience tends to show that in the end the law of supply and demand is just as potent and just as inexorable

Nesmith





Sulphur

Bartlett

as the law of gravity. The engineer would accept that fact and would attempt to construct within such limitations as it places upon his activities. Law makers and many others do not appear to recognize such a necessity.

Now to me it is curious that the engineer has not even thought it necessary to raise his voice during many years of apparently unjustifiable expenditures in the field of agriculture, if indeed, he even took the trouble to learn enough about the actions of his elected representatives to know that they were making such expenditures. Certainly had the engineer applied his professional methods to his responsibilities as a citizen he would long ago have questioned the sanity of much of our agricultural policy and of the resultant expenditures. Note please, that it is not necessary to know the correct solution; it is only necessary to audibly question things and acts that will not bear unbiased analysis on a common sense factual basis. And note also that it is not necessary to go into politics to do this.

Again, let us take the matter of transportation. The Federal Government and certain local governments have spent taxes freely on the development of harbors, waterways and other things tending to foster and to cheapen water-borne commerce. Within the past two decades various governmental units have spent money lavishly in building paved roads for the comparatively free use of automobiles, trucks, and buses in paralleling our principal steam railroad and electric railroad lines. At the minute, numerous governmental units are spending money in the development of airports, airways, and other instrumentalities for the improving and cheapen-

ing of aerial transport and commerce. It does not appear to have occurred to anyone to ask certain pertinent questions and to insist upon rationally developed answers before submitting to such taxation. For example, one might ask whether, after the development of such facilities out of taxes, there will be enough demand for transportation to utilize them all. If not, can the railroads survive? If they cannot, can we get along without them?

It does not appear to have occurred to many that much of the present structure of our civilization is built upon the assumption of the continued solvency of our steam railroads. For example, we put our money in savings banks and we invest prudently in life insurance, the while we are busy undermining the values upon which the integrity of such structures and the safety of our money and provisions for the future depend.

Instead of considering such matters in a common sense fashion and on the basis of facts, we join the mob in its inherent mistrust of such large organizations as the steam railroads, we jump to the conclusion that their charges are too high, that they will throttle us if they can, and that we should teach them a lesson that they will not forget. The possibility that we are seriously injuring ourselves and our own best interests never enters our heads because we are swayed by passion and not by reason. I believe that the application to problems of this sort of the kind of thinking the engineer does when solving problems of an engineering character would be very fruitful.

Please understand that I am not defending the railroads. I believe that they have been exceedingly shortsighted in many respects. They still do altogether too many things as they were done ten and fifteen and twenty years ago. My friend, C. F. Kettering of General Motors fame, is fond of exemplifying this matter by stating that there has been only one major improvement in Pullman cars in the last two decades and that that consists of the introduction of a slot in the wall of the car through which one may dispose of razor blades. Of course things are not quite so bad as this would imply, but they are bad enough. The steam railroads certainly have not made such advances in engineering, in methods, and in public relations as might legitimately have been expected of them in recent years. They have become too greatly inbred and they need an infusion of new blood. But, until we are satisfied that we can do without them we should be using our energies in forcing them to improved service rather than in hounding them to death. And I, for one, am convinced that we cannot do without them.

As another example in this field we might consider urban transportation. Not so very long ago the electrified street railway was practically the only means of getting about in a city of any size. Then came the automobile and after that the motor bus. In recent years we have been very busily engaged in spending huge sums of money to improve and widen streets so that such automobiles and buses may move more freely from place to place. It is now popularly supposed that the day of the rail car is over and that private automobiles, buses and taxicabs can supply all the transportation facilities that will be required in the future. Therefore, communities



F. S. Lincoln

The plaques shown above and below were sculptured by Robert Garrison for the RKO office building, Radio City

are urging that rails be removed from the streets and with them the lumbering and noisy street cars. But, it does not appear to have dawned upon any of our leaders of public opinion to investigate before acting and to determine whether the underlying assumption is a correct one.

A very brief consideration of the facts shows a number of interesting things. At present, as an average over this country, between six and seven people out of every 10 are dependent upon some form of public urban transportation. The assumption made by some molders of public opinion to the effect that the private automobile and taxicab will ultimately replace all forms of public conveyance is so far from possible as to be ridiculous. Neglecting the question of fares, studies made in representative cities show that there could be no business district under such conditions because the street space required for automobile flow would occupy the entire area. However, it is not necessary to go as far as this. Even less radical assumptions are shown to be at present impossible of attainment. The tax burdens that have been loaded recently upon the shoulders of city dwellers for the widening of streets and the building of special automobile arteries speak for themselves. It may tickle civic pride to spend from \$500,000.00 to \$5,000,000.00 a mile in widening streets and building special highways to produce a passenger capacity of about 4,000 persons an hour in one direction as against permitting a private company to spend about \$100,000.00 to \$150,000.00 a mile to produce a passenger capacity about three times as great. But, civic pride cannot stand long in the face of impossible levels of taxation.

We are just beginning to appreciate the effects that such buses are having on street capacity and on street paving. Almost every city in which modern buses are now operating as an essential part of the public transportation system will shortly discover itself faced with tremendous expenditures for replacing deteriorated pavements. And then, you may expect to see the bus lines loaded with much heavier taxes in an effort to make them shoulder this item of expense. Most of the states have already discovered the effects of large buses

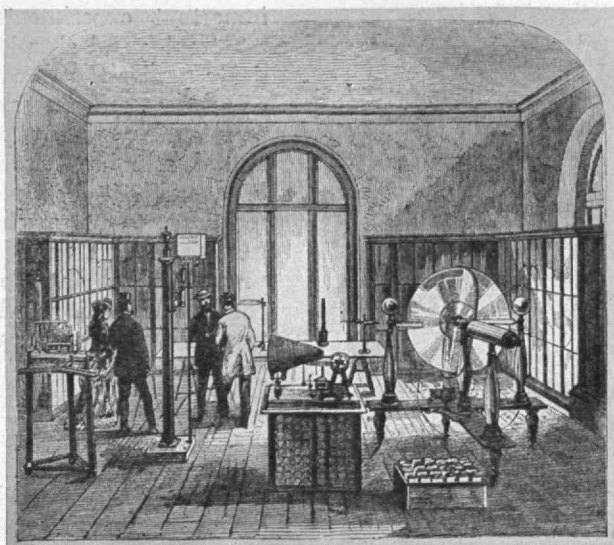
upon improved highways and are engaged in passing restrictive legislation as to dimensions, weights and even speeds in addition to increasing the tax burden. Such state laws are already in effect in some cities by virtue of the fact that these cities have accepted state aid in defraying the costs of widening and paving arterial highways. And it will not take a great increase in the operating and overhead charges to make many bus lines much less promising investments than they are now popularly supposed to be. We have accepted without any real investigation a whole lot of half-baked information about the relative virtues of urban bus versus urban rail transportation.

Another large question now under political discussion is the St. Lawrence waterway and its associated hydroelectric power plants. In spite of the fact that I am a fairly wide reader, I confess that I know nothing about the rights and wrongs of the waterway part of this project. If I were required to vote upon it now, I should have to do so in absolute ignorance of essential facts. As I understand the matter, it appears that a waterway which is open only part of the year is to carry a large part of certain kinds of freight now moved during that part of the year by the steam railroads. Then, when the waterway is closed by ice, the good old railroads are expected to be on the job to render the necessary service. It may be that by the time this waterway is finished our shipments of freight will have grown so large that both it and the railroads will be needed and can get enough business to support both. I do not know. But I must confess that I have not yet seen any attempt to justify the expenditure on such a basis.

I am in a better position to form my own judgments regarding the proposed hydroelectric features of the development. And I have been greatly amused by a pretty political game. The engineers who worked out the probable costs of the hydroelectric part of the project arrived at a figure which is believed by some experts to be too low. In spite of this fact certain politicians insist that the first cost should be and shall be much lower. You must understand that the parts of the investment charged respectively to waterway and hydro plants must add up to the total expended, but that there is a possibility for honest differences of opinion regarding allocation. Now it so happens that the part of the total estimated cost which originally (Continued on page 304)



F. S. Lincoln



*The First Rogers Laboratory of
Physics*

Physics at M. I. T.

A History of the Department from 1865–1933

BY H. M. GOODWIN

EDITOR'S NOTE. — Both Dr. Goodwin's article below and its companion piece, Dr. Davis' History of the Department of Chemistry published last month, have been prepared in anticipation of the Dedication Exercises on May 1 of the George Eastman Research Laboratories of Physics and Chemistry.

As this issue of *The Review* goes to press, the following items are included in the dedication program:

9:30 a.m. Meeting in the large Lecture Room of the Eastman Laboratories.

Address by Dr. Karl T. Compton, President of the Massachusetts Institute of Technology.

"The Graduate School," Professor Harry M. Goodwin, '90, Dean of the Graduate School.

"Science at the Massachusetts Institute of Technology," Professor Samuel C. Prescott, '94, Dean of Science.

"Physics at the Massachusetts Institute of Technology," Professor John C. Slater.

"Chemistry at the Massachusetts Institute of Technology," Professor Frederick G. Keyes.

11:15 a.m. Inspection of Laboratories and Exhibits.

1:00 p.m. Buffet Luncheon in the Walker Memorial Building.

2:15 p.m. Meeting in Room 10-250.

"Cosmic Rays," Professor Arthur H. Compton of the University of Chicago, introduced by Professor Slater.

"Thirty Years of Physical Chemistry," Professor Charles A. Kraus, '08, of Brown University, introduced by Professor Keyes.

3:45 p.m. Resumed Inspection of Laboratories and Exhibits.

4:30–5:30 p.m. Tea in the Forris Jewett Moore Room.

6:30 p.m. Dinner in the Walker Memorial Building (Music by the Combined Musical Clubs).

9:00 p.m. Reception by the President and the Staff of the George Eastman Research Laboratories, Forris Jewett Moore Room.

Many institutions and scientific bodies have been invited to send delegates, and numerous Alumni of the two departments are expected to be present. On Saturday, April 29, the Northeastern Section of the American Chemical Society will meet at the Institute and have as its speaker Gilbert N. Lewis, a member of the Institute Staff from 1905 to 1912, now at the University of California.

THE history of the Department of Physics centers around the evolution of the Rogers Laboratory of Physics from a single room in which it was established in the Rogers Building to the present group of special laboratories devoted to instruction and research in the various fields of classical and modern physics. The facts which have been brought together in the following chronicle are based upon data found in early departmental reports and Institute catalogues and upon personal recollections of the writer.

The Massachusetts Institute of Technology was incorporated by act of the Legislature, April 10, 1861, for the purpose of "instituting and maintaining a Society of Arts, a Museum of Arts, and a School of Industrial Science. . . ." The first formal opening of the Institute was a meeting of the Society of Arts at which the President of the Institute, William Barton Rogers, presided and was held in the Mercantile Building on Summer Street on December 17, 1862. The second project — a Museum of Arts — has never been carried out. The inauguration of the School of Industrial Science, now synonymous with "Technology," was delayed for several years on account of the Civil War, but in 1864 a "Scope and Plan of the School of Industrial Science of the Massachusetts Institute of Technology" was drawn up



Professor Edward C. Pickering, First Director of the Rogers Laboratory of Physics

by President Rogers and adopted by the Corporation. This document contained detailed plans of the courses to be offered and the character of instruction to be inaugurated in the new school. The School was formally opened in temporary quarters in the Mercantile Library Building, on Summer Street, in February, 1865, with an entering class of 27 students. The following fall the Institute moved to the newly completed Rogers Building on Boylston Street.

Among the various projects proposed in President Rogers' "Scope and Plan" was the establishment of four laboratories, one of which was unique at that time, namely, for instruction in "Physics and Mechanics." The purpose of this laboratory was described as follows:

"In this laboratory, it is proposed to provide implements and apparatus with which the student may be exercised in a variety of mechanical and physical processes and experiments. Thus he may learn practically the methods of estimating motors and machines by the dynamometer, of experimenting on the flow of water and air, or other gases, and of testing the strength of the materials used in construction. He may become familiar with the adjustments and applications of the microscope; be practised in observing with the barometer, thermometer and hygrometer; and, in a room fitted up for photometry, may learn the mode of measuring the light produced by gas and other sources of illumination, and the value of different kinds of burners, lamps, and their appendages."

It was further explained under "Practice in Physical and Chemical Manipulations":

"It will be the object of these exercises to make the student practically familiar with the adjustments and use of the apparatus and agents employed in the more

important experiments and processes in natural philosophy and chemistry. With this view, the students, under the direction of their teacher, will be called, by small classes at a time, to execute with their own hands various experiments in mechanics, pneumatics, sound, optics, electricity, and other branches of experimental physics, and to exhibit chemical reactions, to fit up chemical apparatus, to prepare gases and other products, and demonstrate their properties by suitable experiments, accompanying these manipulations, when required, with an explanation of the apparatus used, or of the process or experiments performed."

So far as is known this is the first clearly defined proposal to teach physics by the laboratory method.

At the outset, in 1865, Professor Rogers assumed not only the duties of President of the Institute but also those of Professor of Physics and of Geology. In the next year, however, Edward C. Pickering, a graduate of the Lawrence Scientific School of Harvard University, was appointed instructor in Physics and two years later advanced to the grade of full professor. President Rogers and he, therefore, constituted the first staff of the Department of Physics. Physics was common to all curricula beginning in the first year with Mechanics and continuing through the second and third years with opportunity for advanced study for those desiring it in the senior year. It was taught at first without the facilities of a laboratory.

In April, 1869, however, Professor Pickering drew up a carefully worked out "Plan of a Physical Laboratory" based on President Rogers' original idea of supplementing lecture and class-room work in Physics with laboratory experiments performed by the student. This was approved by the Corporation, and in the fall of that year the first laboratory for instruction in Physics was opened under his direction. The laboratory was located in what is now the exhibition room of the Architectural Department in the Rogers Building, the rear room on the first floor. On page 287 is a sketch of one end of the laboratory as it appeared at that time. This laboratory was unique not only in being the first one of its kind but also for the nature of its equipment. Pickering had nothing upon which to model it and, for lack of funds, he was obliged to equip it at first with apparatus devised and constructed almost wholly by himself and his students. It was in every sense his own creation. In a report to President Runkle in 1877 he states:

"Instead of an original expenditure of several thousand dollars, the cost to the Institute was little beyond that of fitting up the room adjoining the lecture-room with tables, and gas and water fixtures, and most of this was done by those already connected with the Institute. The apparatus was largely constructed in a similar manner, at small cost, and without regard to looks, the working being almost the sole consideration. Notwithstanding these adverse circumstances, the work of the laboratory has been continually increasing."

The enthusiasm with which he inspired his students may be judged by another quotation from the same report:

"A good test of the character of the instruction, is the relation of teacher to pupil. My own relations, which have always been of the pleasantest character, I ascribe to the interest of the classes in their work. They remain beyond the hour, encroach upon their dinner-hour, and frequently ask, and are allowed, to work at other times which they might devote to amusement. With this condition of things disorder is almost unknown, and they are treated, and I believe regard themselves, as friends and guests, rather than as pupils. Of course the consequence shows itself in a largely increased amount of work, and a saving of much of the nervous wear and tear of a teacher's life."

The directions for performing the numerous experiments which Professor Pickering devised for his classes were collected and published in 1873 in Pickering's "Physical Manipulation." This, so far as is known, was the first physical laboratory manual ever published and for many years was the accepted text used in other laboratories, which, by 1873, were being established in the more progressive colleges and technical schools. Professor Pickering dedicated this work to "William Barton Rogers, The First to Propose a Physical Laboratory."

On February 14, 1872, the Corporation of the Institute passed the following resolution:

Resolved that in slight recognition of the eminent services William Barton Rogers has rendered the Institute of Technology the Physical Laboratory of the Institute should be designated and hereafter known as the "Rogers Laboratory of Physics."

Professor Rogers expressed his deep appreciation of this action in the following letter, read before the Corporation May 8, 1872:

Newport, May 4, 1872.

To the Government of the Mass. Inst. of Tech.

Gentlemen:

I beg you to accept my thanks for the great honor you have done me in giving my name to the Physical Laboratory of the Institute.

Laboratories of Chemistry and of Metallurgy have long formed a part of the instrumentalities for instruction in scientific institutions in this country and in Europe; but many years ago, while engaged in the teaching of Physical Science, I was impressed with the great need of a similar practical means of instruction in connection with the Department of Physics. The introduction, therefore, of this appliance as a part of the system of our School was a cherished purpose in drawing up the "Scope and Plan" of the Institute of Technology.

I may perhaps be allowed to add that when, in preparing this pamphlet in the spring of 1864, I included a Physical Laboratory as among the practical means of instruction to be established in our School, and stated in brief some of the leading objects of such a laboratory, I indulged the belief that I was initiating a very important improvement in the methods of scientific training, for which hitherto no provision had been made either abroad or at home.

The extent to which this idea of a physical laboratory has been followed out in other institutions, and the number of instances in which our own Laboratory, so admirably organized and directed by Professor Pickering has been consulted by them as an example, show very clearly how prompt and general has been the recognition of the value of this step in educational progress.

Our Institute may thus, I think, in this as well as in other features of its organization, claim the credit of having made an advance in practical scientific education.

I remain, with great respect,

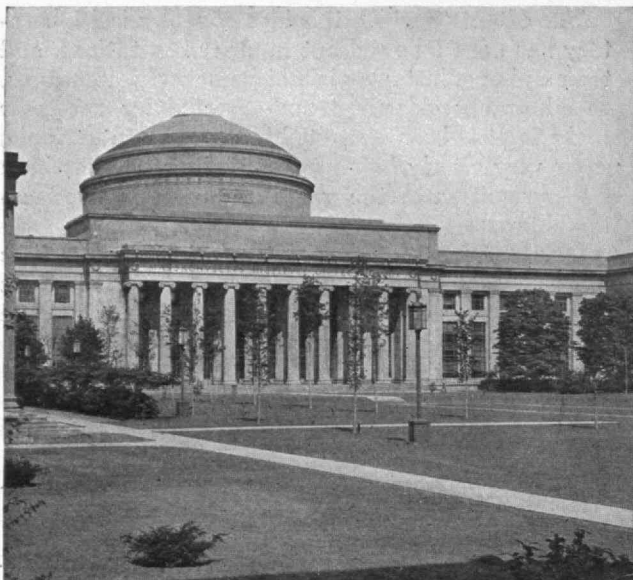
Your obedient servant

William B. Rogers

Professor Pickering was appointed the first "Director of the Rogers Laboratory of Physics." He was also designated as "Thayer Professor of Physics," a title which Professor Rogers had held in 1867-68, this professorship having been endowed by Mr. Nathaniel Thayer of Boston. Professor Pickering administered the Department of Physics for ten years. In 1877 he resigned to become the Director of the Harvard College Observatory, which position he held with great distinction until his death in 1919. How much the Institute owes to the pioneer work of Pickering in initiating and developing the Rogers Laboratory of Physics can only be appreciated by reference to his last report on the Department in which he summarizes the accomplishments of his ten years of administration.



Professor Charles R. Cross, '70, Director of the Rogers Laboratory of Physics



North East Corner of Eastman Court where the Rogers' Laboratories are now located

It is clear from this report that under his administration the Rogers Laboratory took on from the beginning not only the function of a teaching but also that of a research laboratory. He was preëminently a scientific investigator and his resignation was a great loss to the Institute. It is astonishing how much research he was able to accomplish with his students with the very limited equipment at his disposal. No less than 14 papers were published from the Laboratory before he resigned. At that time began the series of "Contributions from the Rogers Laboratory of Physics" in the Proceedings of the American Academy of Arts and Sciences, which continued many years until, in more recent times, the journals of the various professional societies have absorbed most of the output of the laboratory.

Professor Pickering was succeeded by Charles R. Cross, whose rapid rise from the position of assistant in the department the year after his graduation in 1870 to full professor in 1877, was exceptional. Cross was one of Pickering's outstanding students in physics. He graduated in the course then called "Science and Literature," there being at that time no curriculum leading to a degree in Physics. Professor Cross directed the work of the Department of Physics with untiring devotion and great distinction for 40 years — 1877 to 1917 — during which period he was very influential in the building up of the Institute from a small School of approximately 200 students to an Institution of national reputation with a registration of over 2000. He was not an investigator, like his predecessor, although he published many papers of importance, particularly in Acoustics and Telephony, fields in which he was a recognized authority. He was, on the other hand, an exceptionally fine lecturer and teacher and a very able executive. He delegated authority to those of his colleagues in whom he had confidence and furthered their work with friendly advice and financial backing to the limit of his budget appropriations. In particular he anticipated the trends of science in its applications to industry and shaped the

work of his department to the end that its graduates should be fully prepared to become leaders in their chosen field.

Professor Cross is probably best remembered by his many students for his lectures on experimental physics. These were his pride and joy. That they should be up to the minute in matters discussed and material presented, and profusely illustrated by the most effective and beautiful experiments, was his untiring aim. It may be truly said that for many years these lectures were probably unsurpassed either in this country or abroad. It is pleasant to remember that he had the great satisfaction before his retirement in 1917 of giving his lectures the first year after the Institute moved to the present site, in the large lecture room the details of which he had planned with great care. It was also his custom to give each year a series of illustrated afternoon lectures on some special topic such as Polarized Light, Electric Waves, or Electrical Discharges in Vacuo — open to members of the staff and students who were interested to attend. The only approach to these lectures, which have since been given at the Institute, were those by Professor Scherrer, visiting professor from the Polytechnic School in Zurich, in 1930. The tremendous interest shown in this course indicated that the custom inaugurated by Professor Cross might well be resumed.

Professor Cross died in 1921, four years after his retirement as Thayer Professor of Physics Emeritus. Since his death the title of "Director of Rogers Laboratory of Physics" has not been conferred.

The first important expansion in the work of the Physics Department came in 1883 when the so-called "New Building," afterwards named the "Walker" building was completed. The Department was transferred from the Rogers building to what at that time seemed palatial quarters, with ample room for expansion.

The General Laboratory occupied the east side of the first floor and a more cheerful and attractive laboratory it would be difficult to find today. The west side was devoted to advanced laboratory work in Physics. In the basement ample space was available for heavy machinery which was soon to be installed in connection with the work in Electrical Engineering. The Department also acquired its own Lecture Room, "Room 22," its library — of inestimable value — and a large pleasant study for the staff.

As the Rogers Laboratory now gradually expanded it was recognized for leadership in developing original experiments, initiating new fields of instruction, and for its fine equipment. Some of the special laboratories which were created will be mentioned later. The last decade of the century was a period of rapid expansion and the main efforts of all members of the limited staff were centered primarily on teaching rather than on research. Although a number of valuable papers were published from the laboratory during this period the importance of research was not stressed as it had been in Pickering's day.

Foreseeing the opportunities for men thoroughly trained in theoretical electricity and its applications to telephony, electric lighting, electrical machinery, and electric traction, industries at that time in their infancy, Professor Cross proposed and organized in 1882 the first

course in Electrical Engineering. The curriculum was first announced as "Course VIII, Physics B." The following year it appeared in the Catalogue as "Electrical Engineering," and in 1884 it was given its present Course number, VI. For many years Professor Cross himself conducted the classes in the "Technical Applications of Electricity." His course in Telephony was unique, he being the recognized authority in this field and for many years chief scientific expert and adviser of the American Telephone and Telegraph Company. Prominent outside lecturers were also invited to give courses on special topics, one of the first being Dr. Elihu Thomson. Electrical theory was taught for many years by Professor Harry E. Clifford, himself a graduate of the course in Electrical Engineering in 1886 and now Dean of the Engineering School at Harvard University.

As a consequence of the inauguration of the course in Electrical Engineering, the next important addition to the Rogers Laboratory was the dynamo-electric or electrical engineering laboratory. This was ably conducted for a number of years by Professor William L. Puffer of the Class of '84. The Rogers Laboratory was further extended by the addition of a large laboratory devoted exclusively to electrical measurements under the direction of Professor Silas W. Holman, and later developed by Professor Frank A. Laws, '89.

The course in Electrical Engineering remained under the direction of the Physics Department until 1902, when, at the request of Professor Cross, it became a separate department. The Electrical Engineering Laboratories were transferred to the Lowell Building, in Trinity Place, and thereafter designated as the "Augustus Lowell Laboratories of Electrical Engineering."

The success of the Course in Electrical Engineering as organized and administered by Professor Cross may be judged by the subsequent outstanding accomplishments of its students. Among the present life members of the Corporation the following were former students of Professor Cross in the course in Electrical Engineering: William H. Bovey, '94, Francis R. Hart, '89, Henry A. Morss, '93, Alfred P. Sloan, '95, Charles A. Stone, '88, Gerard Swope, '95, and Edwin S. Webster, '88.

An account of the Department of Physics during the 80's and 90's would not be complete without special mention of one who, laboring under the handicap of ill health and physical disability, contributed much to the prestige of the Rogers Laboratory, namely, Professor Silas W. Holman. Holman was also one of Pickering's students in Physics, graduating with the Class of 1876. He was at once engaged as an assistant and after Pickering's resignation became second in command in the Department with Professor Cross. Holman was a research man of a very high order. Had he been blessed with health and given the opportunity for carrying on research, he would unquestionably have ranked high among the experimental physicists of the country. His papers on the viscosity of gases and thermoelectric and resistance pyrometry bear witness to his ability and skill as an experimental physicist.

Professor Cross very wisely placed Holman in charge of the laboratory work which he developed in a manner worthy of his teacher, Pickering. He possessed great

skill and ingenuity in devising apparatus and precise methods of measurement. In particular, to him is due the credit of initiating the laboratory of electrical measuring instruments and the laboratory of high temperature heat measurements. He also originated the well known course in "Precision of Measurements," long recognized as fundamental to courses in science and engineering. During the later years of his life, when physically incapacitated, he published a most interesting and philosophical book entitled "Matter, Energy, Force and Work."

Those who had the privilege of knowing Professor Holman intimately held him in affectionate esteem. Among his students in Physics who have attained international recognition for their scientific achievements are George E. Hale, '90, Honorary Director of the Mt. Wilson Observatory, Charles G. Abbot, '94, Secretary of the Smithsonian Institution, and the late George K. Burgess, '96, Director of the Bureau of Standards.

In 1901 the Department of Physics was again pioneer in establishing the first course leading to the Degree of Bachelor of Science in Electrochemistry. This course was initiated by Dr. H. M. Goodwin, '90. The professional work of the course was based upon a fundamental knowledge of Electrical Engineering and of Chemistry and was planned to meet the needs of students who desired to prepare themselves to enter the electrochemical industries which, 30 years ago, were just beginning to be organized. As early as 1894 the subject of Electrochemistry had been introduced into the curriculum of the course in Physics and in (*Continued on page 312*)



Bartlett

George Eastman Research Laboratories of Physics and Chemistry

Airship

A Balance Sheet of

BY DANIEL

CREDITS

THE history of rigid airships is replete with triumphal achievements and unending advances in design and operating technique. Between 1910, marked by the launching of the first aircraft of this type, and the summer of 1913, 26 Zeppelins were built and successfully flown without a single fatality. From 1910 to 1914 the *Deutsche Luftschiffart Actien Gesellschaft*, known by its initials as the DELAG, operated the world's first commercial air lines, using a fleet of six Zeppelins. The ships flew a total of 172,000 miles and carried 33,000 passengers.

During the War the Zeppelin raids over England served a valuable purpose by requiring the British to hold numerous air squadrons and batteries of artillery at home when they were badly needed at the front. They also succeeded in keeping the civilian population in a continual state of jitters. By necessitating the darkening of towns and the interruption of work during raids and false alarms of raids, they interfered seriously with the progress of work in munitions and other factories.

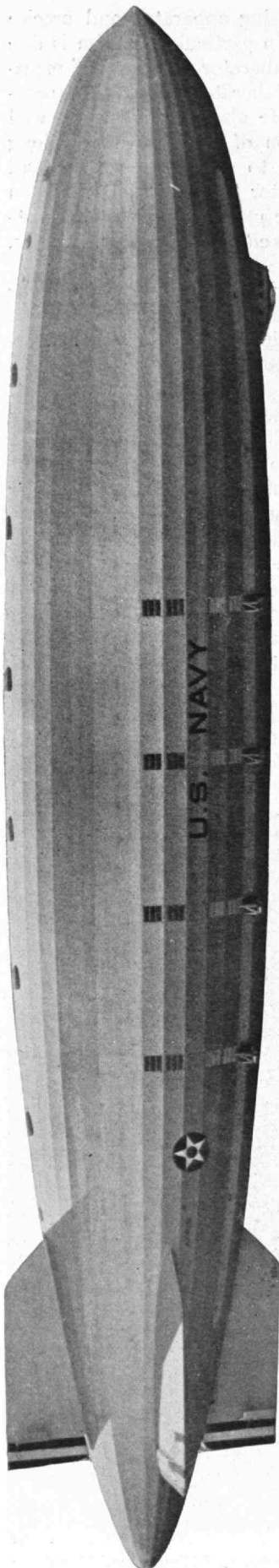
The work done by the airships attached to the German Navy was of inestimable aid in the task of patrolling the coast of the North Sea area and in scouting operations against the Allied fleet. On the second day of the battle of Jutland, scouting Zeppelins were able to warn Admiral Scheer of the approach and the disposition of strong British reinforcements, enabling him to break off the battle and retire without serious loss.

In 1917 a Zeppelin was despatched from Bulgaria to carry much-needed medical and military supplies to the beleaguered German forces in East Africa. When it had almost reached its destination, it learned by radio that the forces to whose assistance it was hurrying had already capitulated. Turning its nose homeward, it succeeded in reaching its Bulgarian base, a non-stop flight of 4,225 miles.

In 1919 the British *R-34* negotiated the first Atlantic crossing, reaching Roosevelt Field, L. I., in 108 hours. The return to England was made a few days later. During 1924 the American *Shenandoah* and the British *R-33* suffered strikingly similar adventures. The final result in both cases did much to increase the faith of the services in the general abilities of airships. Both ships were used extensively in their respective countries in developing the technique of the high mooring mast. During the process of these operations, both ships were blown away from their masts in high winds. Both lost considerable parts of their nose sections in the tearing away process. And yet, both ships were able to ride out the storm condition and return under complete control to the home station.

Also in 1924 the Germans delivered the airship which was to be christened the *Los Angeles*, crossing in 81 hours. This ship was in continuous service for eight years before it was retired by the United States Navy to make room for the *Akron* and its sister ship, the *Macon*. In 1928 the *Graf Zeppelin* was launched and has since had a most triumphal career. It has crossed the North Atlantic five times and has made nearly a score of trips to Brazil. It has operated far into the polar regions, and in 1929 went completely around the world in slightly under ten days' flying time. Its longest single flight on this journey was 6,980 miles from Germany to Japan, and the ship arrived in Tokyo with enough fuel for 3,000 more miles. In 1930 the giant British rigid, the *R-100*, crossed to Montreal. On its return flight it came within two hours of matching the best time for an Eastward crossing, which had been set up by the *Graf Zeppelin*, 55 hours and 22 minutes.

(Continued on page 294)



Audit

Achievement and Failure

C. SAYRE

DEBITS

THE history of rigid airships is the history of perseverance in the face of unending and increasingly spectacular disasters. Of the first 26 Zeppelins built between 1900 and 1913, no less than 13 met accidental destruction. That no passenger or crew member was ever fatally injured, was due to a remarkable train of fortuitous circumstances, no less spectacular than the accidents themselves.

The operations of the DELAG were necessarily subsidized by the German government. They consisted much more in sight-seeing trips in the neighborhoods of single cities, than they did in scheduled inter-city trips. During the autumn of 1913 accidents occurred to the Zeppelins, LZ-14 and LZ-18, which resulted in the deaths of 31 men.

During the war-time raids over London the German airships failed to achieve any degree of success in their primary purpose of destroying factories and buildings of direct military importance. At first anti-aircraft artillery and airplanes seemed unable to cope with the airships. The development of faster climbing airplanes and incendiary projectiles soon turned the tables. After 1916, raids over England were in almost all cases carried out in heavier-than-air bombing planes.

The naval scouting activities of the airships were greatly hindered by fog on a number of important occasions. The entire battle plan for the first day of Jutland had to be changed because the cooperating Zeppelins were fog bound. Two-and-a-half months later a promising raid on England, by submarine, surface fleet, and Zeppelin was brought to naught through the crippling of the airships by the fog, and because eight airships were not enough to give the complete scouting coverage desired.

In 1926 E. A. Lehman, famed airship commander, published the following figures relating to the ultimate fate of the first 114 Zeppelins:

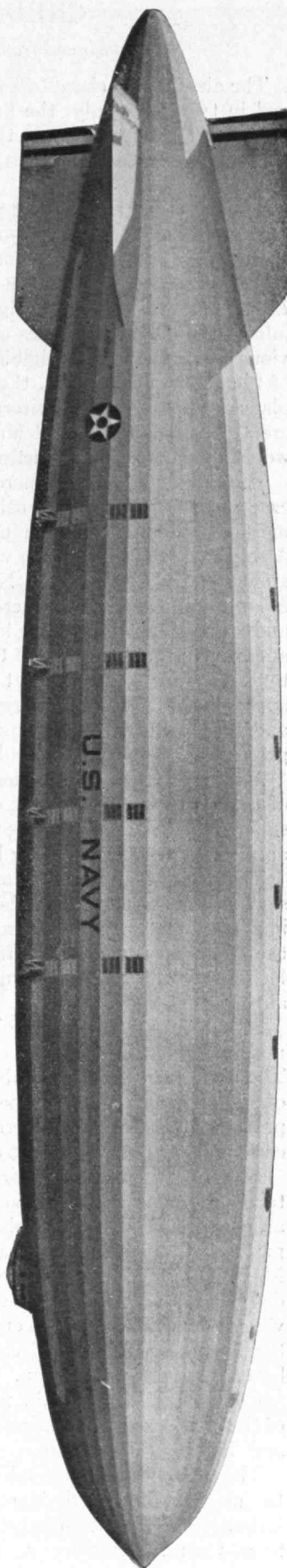
Obsolete and dismantled after successful careers	21
Surrendered to the Allies	9
Destroyed by crews on "Scapa Flow Day"	7
Lost on military missions:	
Burned in air	17
Stranded after heavy damage	19
Landed after exhaustion of fuel	7
Destroyed in hangars:	
By accidental fires	5
By enemy action	8
Wrecked during ground handling	6
Wrecked during landing	12
Burned in air due to lightning	1
Destroyed due to engineering defects	2

114

The British airship program has from its inception been marked by disappointment and disaster. In 1911 their first rigid, the *Mayfly*, did not. On a second trial, after the structure had been lightened, the ship was broken amidships while being taken out of its hangar. Some 14 ships were undertaken during the War but only nine of these ever saw completion, and of these, only two, the R-33 and R-34, were of much use. They had been copied from the Z-33 which had been shot down over England.

(Continued on page 294)

(293)



CREDITS

(Continued from page 292)

The airship lays claim to a useful future in two fields, and in two fields only: the first in naval scouting and patrol work, the second in the carrying of passengers and mails over long distances especially in transoceanic work.

The naval lighter-than-air proponents rest their case on the low costs of airships and their vastly superior speed, when compared with surface vessels. During the maneuver games against the Canal Zone in 1930, the *Los Angeles* was the first to sight the attacking fleet and inform the defending forces of its position. To its previous merits the naval dirigible has added, in the designs of the *Akron* and *Macon*, the ability to carry five airplanes and several anti-aircraft guns, thus increasing greatly its defense against airplane attack. The planes would also be a great assistance in scouting activities.

The proponents of commercial airship lines rest their case on a number of potentialities of giant dirigibles, most of which have been extensively demonstrated. A ship the size of the *Akron* would have the load-lifting ability easily to make the North Atlantic, the South Atlantic, or the Hawaiian crossing with fuel to spare, and a commercially feasible load. The gross lift of such a ship is approximately 200 tons; the useful load is 90 tons. Fuel for 4,000 miles at 60 miles per hour would approximate 40 tons, the crew of 75 with their effects and food another 15, leaving a margin of 35 tons for passengers, baggage, and mail.

A cruising speed of 60 miles an hour and a top speed of a little over 80 would be enough to establish great superiority over ocean-borne traffic, and would insure ample reserve for combating head winds.

The use of helium for inflation makes the gas explosions of the past an impossibility, permits smoking (an important feature in attracting passengers), and renders the ship comparatively safe from the perils of lightning. Helium also decreases the vulnerability of the military airship to gun fire.

Structural advances, especially in the feature of the multiple keels, add greatly to the safety of the craft. The additional keels have also permitted the inclosure of all engines, made available a great deal of cabin and promenade space, and increased the possibilities of complete inspection in flight of the entire ship.

Diesel engines, suitable for airship service, are a certainty in the near future. The *R-101* was equipped with an experimental type, which, if not entirely up to expectations, represented at least an important first step. Maybach, builder of all the motors for the German designs, is understood to have a Diesel type under advanced development. Such engines would further reduce the fire hazard, greatly decrease the cost of fuel, and lower the fuel consumption.

Commercial lines would necessarily take advantage of the advances made during the last decade in mooring and handling procedure.

The overall life of an airship should now be sufficient to justify commercial depreciation. The *Los Angeles* lasted eight years and many improvements in materials have been made since its (Concluded on page 314)

DEBITS

(Continued from page 293)

The *R-34*, it is true, succeeded in crossing and recrossing the Atlantic, but it has been admitted that it arrived over Roosevelt Field with only 15 minutes' supply of gasoline remaining in its tanks. In July, 1921, a ship of post-war design and construction, the *R-38*, destined for delivery to the American Navy, buckled amidships during its trials and fell in flames, killing 45 of the 50 men who made up her crew.

The French, after experimenting with one or two rigids of their own manufacture, received the *L-72* as a part of their share of the confiscated German war material. Rechristened the *Dixmude*, the ship carried out several notable flights, but in December, 1923, she was lost in a violent electrical storm over the Mediterranean. Of her crew of 50, only the body of the commander was ever recovered.

The airship *Shenandoah* is the only rigid completely designed and constructed by Americans. It met its first accident in January, 1924, when it failed to hold to its mooring mast under storm conditions. It met its final disastrous fate in September of the following year. Circumstances were quite similar to those which recently destroyed the *Akron*. An encounter with a storm of the frontal type caused the ship to break into three parts. The fact that only 14 men were killed out of a crew of 42 was the sole consolation of the airship enthusiasts.

It might possibly be admitted that the design and operating technique for airships up to 3,750,000 cubic feet displacement has been slowly and soundly developed. Certainly the two British attempts at building 5,000,000 cubic foot types seem to have been quite ill advised. They were both distinct disappointments in weight and performance. True, the *R-100* did make a crossing to Montreal and back, but it was severely handled by a storm over Quebec. It was also forced to carry a very restricted pay-load on the journey and many of the highly publicized passenger cabins, with which it was supposed to be equipped, were represented simply by doorways of painted fabric.

The *R-101*, even more of a disappointment to its designers, was started on a flight to India in what almost amounted to a gesture of official desperation. The result was a crash and an explosion during a rainstorm while the ship was over northern France. The holocaust claimed the lives of 54, including the Air Minister, and a group of by far the most brilliant men in British airship circles.

The recent shocking *Akron* disaster must appear as an even more conclusive proof of the impracticability of airships. Many previous tragedies have lacked conclusive force because the ships, or the personnel, or the weather information available have been considered less than a potential ideal. Designed by the most experienced of German designers, the *Akron* incorporated almost every feature which has yet been suggested to increase the safety and utility of such craft. The crew was highly trained and exceedingly competent. The airship was but a few miles from its home station and even nearer to a much-traveled (Concluded on page 314)

THE TREND OF AFFAIRS

'Escences

IN KEEPING with the phenomena they describe, the words *fluorescence*, *luminescence*, and *phosphorescence* are etymologically pale and ill-defined. The description on page 282 of Professor Huntress's beautiful demonstration of *chemiluminescence* prompts a brief excursion into the nature of the various 'escences and some of their curious uses.

The word fluorescence, like the words luminescence and phosphorescence, has a commonly accepted meaning which is definite enough, but, like these other words, it also has a penumbra of meaning which overlaps that of the other words. Thus there are substances which glow when x-rays or cathode rays fall upon them, and they are frequently said to be fluorescent, or luminescent, or phosphorescent, according to the taste of the speaker. A "fluorescent" screen coated with barium platino-cyanide forms part of an apparatus called a "fluoroscope" by which x-ray pictures may be seen without being photographed.

A substance is commonly said to be luminescent if, after exposure to visible or invisible radiation, it continues to give off visible light. The figures on the dial of a radiolite watch are luminescent. The property was first discovered by a certain Baldwin of Grossen Hahn in Saxony, who evaporated an impure solution of calcium-nitrate and observed that the residue glowed in the dark after having been exposed to the sunlight. He invented the name of phosphorus for his material, but we now use the word to name another substance and the term phosphorescence for another phenomenon.

About Baldwin's time an Italian philosopher discovered that oyster shells, after being ignited with sulphur, showed the same "phosphorescence." His preparation came to be known as the Bolognese phosphorus. The sulphides of calcium, barium, and strontium are luminescent, especially if contaminated with small amounts of heavy metal, and particularly if a trace of some radioactive substance like uranium is present. During the War a white paint, made of barium sulphide containing a small amount of uranium, was used for painting arrows and other indications of place and direction on black-painted boards. These were exposed to the light of a mercury arc and were taken into the dugouts and underground.

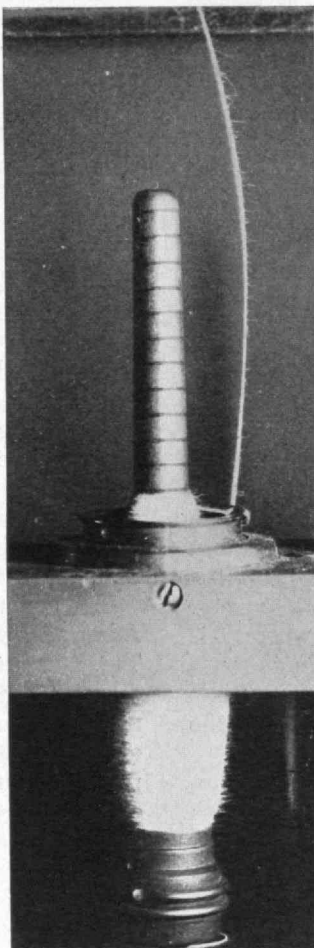
Substances which shine and glow while they are exposed to x-rays, cathode rays, or the radiations from radium are often said to be luminescent or phosphorescent without distinction between the meanings of the words.

The word phosphorescence is commonly used to name the phenomenon, exhibited by phosphorus, of glowing in the dark. The glowing ceases if the phosphorus is protected from the air by being kept under water. Phosphorescence is thus the protracted production of visible light as, for example, by a slow chemical reaction of oxidation, by a slow combustion. The glows of moist, rotten wood in the forest, of fireflies, and of the marine organisms which abound in tropic water have also been

called phosphorescence (*bioluminescence* notwithstanding). And recent studies have indeed shown that the glow of fireflies is produced by the slow oxidation of a substance to which the name of "luciferin" has been given.

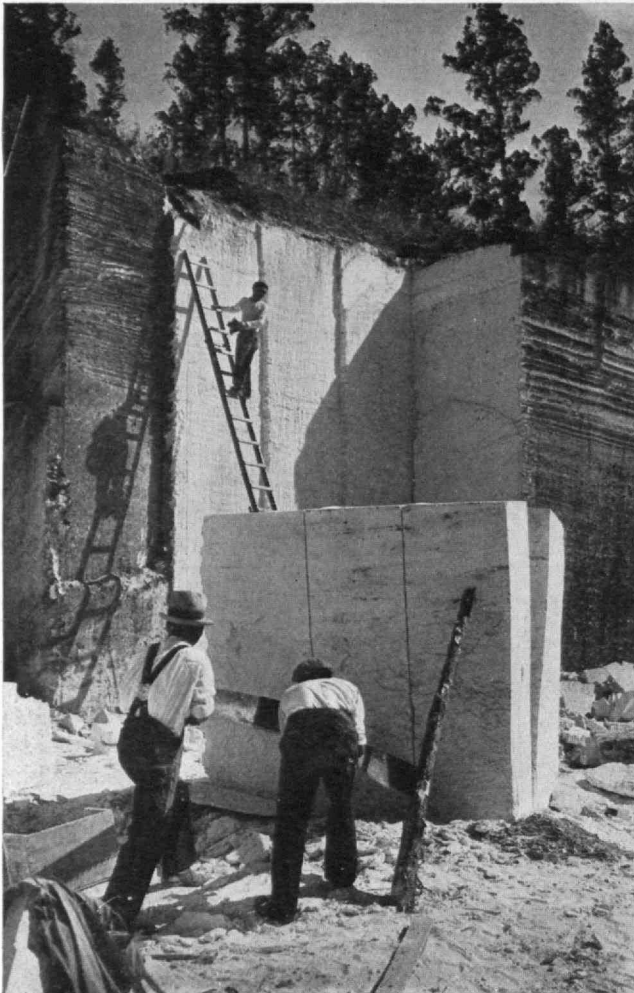
Fluorescence is at present in the public eye, for it is being used in the detection of crime and hence in popular fiction, for the recognition of forgeries and the examination of blood stains, of checks, of seals which have been tampered with, and of faked antiques.

Ordinary light consists of visible radiation and of invisible radiation, the latter being made up in part of infrared which consists of longer waves than the visible and partakes of the nature of heat and in part of the ultraviolet, which consists of shorter waves. A fluorescent substance has the property of converting some of the shorter invisible waves into light which we can see. It reflects a certain selected portion of the visible light which falls upon it, and that selected portion is the color of the substance, but, instead of reflecting all of the ultraviolet radiation which it receives, it absorbs part of it and in return gives out a new or additional visible radiation which is not, in all strictness, any part of the color of the substance. Thus, colorless kerosene has a bluish or purplish "bloom," and yellow lubricating oil a greenish fluorescence. One of the most strongly fluorescent of all known substances is fluorescein, a substance which is used as a yellow dyestuff for silk and wool. Its solutions are yellow if one looks through them. But if one looks at them, they fluoresce so strongly that their yellow color cannot be seen; they look bright grass green and appear to have the oiliness of petroleum. One



M. I. T. Photo

Picture taken in less than 1/50,000 second of yarn being spun. The spindle was turning at approximately 10,000 r.p.m. and the purpose of the study was to observe the curve of the thread and to segregate centrifugal and windage forces acting upon it. Note how the fibers are thrown out from the yarn



F. S. Lincoln

Quarrying coral stone in Bermuda. The stone can be sawed like wood when it is first cut but it hardens on exposure to air

part of fluorescein in 100 million parts of water gives a solution which is colorless, but the solution fluoresces in a strong light and may easily be recognized as different from ordinary water. For this reason fluorescein is often used in studying the possible contamination of a water supply. A quantity of the substance is put where it is suspected that the contamination may originate, on a manure heap, for example. If the well water after a time shows no fluorescence, then no contamination from the manure heap is getting into the well.

Red ink is usually made from eosin, or tetrabromofluorescein, a substance which has a strong greenish fluorescence as may easily be demonstrated by adding two or three drops of red ink to a glassful of water. Anthracene from coal tar is fluorescent, and so is esculine (which occurs in horse chestnuts) and quinine sulphate (which gives in water a colorless solution which has the same bluish bloom as kerosene). Snow and garden flowers and paper and ink are fluorescent, and so in fact, in a greater or less degree, are most of the substances which one might have occasion to examine. The fluorescence of paper depends upon its age and upon the materials and methods of its manufacture. Inks which look alike in ordinary light are likely to differ in their appearance under ultraviolet. The examination of suspected documents by ordinary and by ultraviolet

light simultaneously has become part of the criminologist's routine. Similar methods applied to objects of art and antiquities confirm their genuineness and throw light upon the details of their fabrication.

Most Powerful Submarine

TWO heavy-oil engines more powerful than any hitherto designed for the purpose have been installed in the new British submarine *Thames*. In her sea trials these engines together developed 10,000 shaft horse power, which is far in excess of the power available in any other submarine. Her surface speed in these trials was 22½ knots, which is considered very fast. Only one type of submarine has been more powerful than the *Thames*. This was the British K Class built during the War to meet special conditions. They were driven by steam engines of 11,000 horse power and had a speed about equal to the *Thames*. These vessels were discarded after the War.

The problem that confronts naval engineers in the design of power plants for submarine vessels is a most difficult one. The small amount of space available in such ships makes it necessary to design engines which will deliver the greatest amount of power within arbitrary limitations of size and weight. Up to the present the most powerful submarine oil engines delivered something less than 7,000 shaft horse power.

The *Thames*' engines have a low power-weight factor. They operate on the four-stroke cycle, single acting, and have ten cylinders with a 21-inch bore and stroke. The engines are equipped with supercharging devices for use when the greatest power is necessary. The vessel is not one of the largest, her length being 345 feet, with a width of 28 feet. Her speed, however, brings her nearer to the goal of naval constructors, who long have sought a submarine capable of operating at the speed of the battle fleet, which is about 23 knots. As a rule, the low speed of submarines has made it impractical for them to operate with the main battle fleet except for short periods under favorable conditions.

The engines of the *Thames* were designed by British Admiralty engineers and mark an important advance. The Diesel type or oil engine has come into wide use during the past decade and many large passenger lines and merchant vessels are now Diesel driven. Smaller engines of this type are proving successful in oil-electric propulsion mechanisms for locomotives and passenger cars on many railroads. A light Diesel has been developed for aircraft and, while this type of power plant has not had a wide use in the automotive industry, it is the subject of much promising research.

It is probable that when business conditions improve the Diesel engine will take an important place as a power plant for trucks and buses, and in the field of small craft, such as yachts and pleasure cruisers.

Bluish Glow vs. Whir

THE versatile electronic tube, known in its most familiar form as the device which made modern radio communication possible, has been given a task of unusual significance in the electrical industry. A new

type of tube called the phanotron was recently installed in a substation of the Edison Electric Illuminating Company in Boston, and is successfully carrying on the process of rectifying alternating current into direct current.

Occupying a modest space, the new tubes, which have no moving parts and operate silently, replace elaborate and bulky rotating rectifying machines. Hitherto the heavy rotating machinery, which occupies considerable space, required expensive substation structures where it was necessary to rectify current. This called for heavy investments in real estate, often in congested districts of high land values. The phanotron tube, compact, efficient, and noiseless, is a substation in itself, and may be installed at convenient locations without the necessity for special buildings.

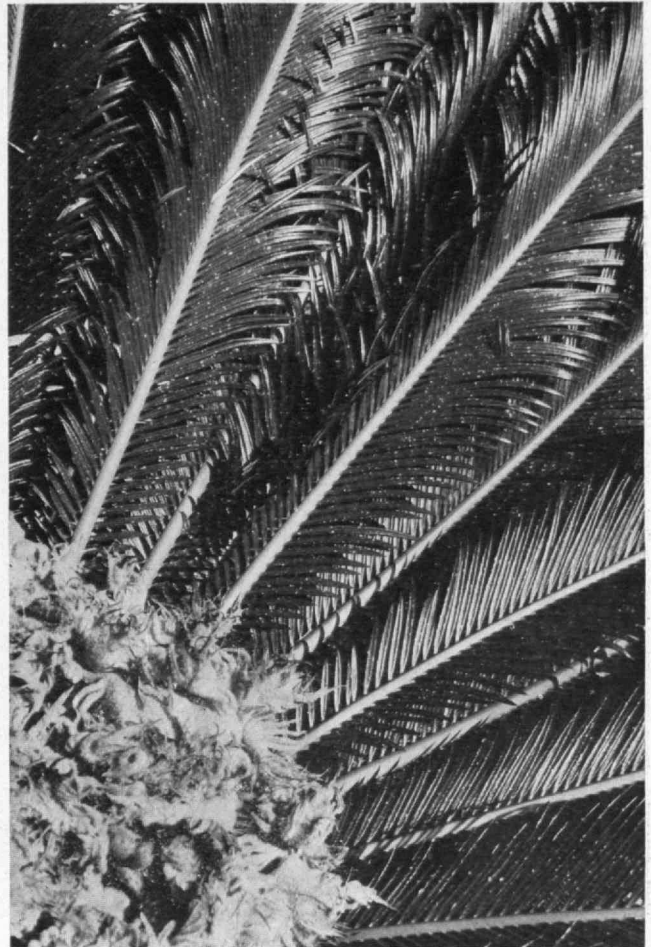
The installation of six phanotrons in the Boston substation has attracted the attention of power company engineers. These tubes receive the alternating current at a potential of 13,800 volts, three-phase, 60 cycles, and deliver direct current to residences, stores, and industrial plants at 238 volts.

Developed by the General Electric Company, the phanotron tube operates on the principle that a hot cathode placed in a vacuum emits electrons which move in only one direction, from cathode to anode, thus making it possible to rectify an alternating current. The name phanotron was suggested by the bluish glow which appears when the mercury vapor in the tube undergoes ionization, the breaking up of its molecules when voltage is applied. The mercury vapor produces sufficient ions to neutralize the space charge, which in high-vacuum tubes of other types limits the tube to handling small quantities of current. Where most tubes are constructed of glass, the phanotrons employ a copper shell about the cathode, reducing the use of glass to a minimum and producing a tube suitable for the most rigorous service demands.

Professor Thomson's Eightieth Birthday

TO THE many tributes paid him during the celebration of his 80th birthday, on March 29 at Technology, Professor Elihu Thomson made the significant reply that his plan of life had been to keep on doing those things which it seemed most natural for him to do, whether it was in electricity, study, or following a hobby. It has been natural for few men to achieve so greatly, to find such satisfaction and happiness in their work, and to have witnessed within less than half their span of life the entire development of a great industry.

The difference between his great contributions to science and engineering and his many hobbies is very slight, for out of the latter have come some of his most important achievements. As a boy he became greatly interested in geology and astronomy, and from these pursuits of his leisure hours came his method for fusing quartz, with important applications to astronomical instruments. In this hobby of astronomy, by means of instruments of his own design, mechanically and optically, he has found relaxation from his research and the opportunity to escape from the earth in the evening for journeys of exploration in illimitable space. One may



F.S. Lincoln

The sago palm of Bermuda

venture the conclusion that the stimulation found in his hobbies has played no small part in his achievements for the electrical industry.

From the beginning of the scientific conference at the Institute in the afternoon, until the last word had been uttered at the great dinner in Walker Memorial in the evening, the celebration of Professor Thomson's birthday was a progression of significant tributes. In the afternoon, Dr. John C. Slater, Head of Technology's Department of Physics, and Dr. Karl K. Darrow of the Bell Telephone Laboratories spoke on the development of electrical theory, particularly during Professor Thomson's lifetime; and President Compton described Dr. Thomson's scientific and engineering achievements.

The celebration had particular significance for the Institute, for Professor Thomson is a Life Member of the Corporation, a member of the Executive Committee of that body, and from 1920 to 1922, was Technology's Acting President. That his work and ideals may be carried into the future, plans have been made for establishing the Elihu Thomson Professorship in Electrical Engineering to which, President Compton hopes, may come teachers who will perpetuate those high ideals of creative scholarship and productive service for which Professor Thomson is distinguished.

President Compton presided at the dinner, and first introduced Governor Joseph B. Ely of Massachusetts, who represented the citizens of the State. Mr. George B.

Cortelyou, President of the Consolidated Gas Company of New York, spoke on behalf of the recently created Edison Electric Institute, of which he is also President. His was the tribute of the electrical industry.

Dr. Harry P. Charlesworth, '05, President of the American Institute of Electrical Engineers, of which Professor Thomson was one of the early Presidents, made the address for the engineering societies. The admiration and respect of educational institutions for the dean of American electrical engineers was expressed by Vice-President Vannevar Bush, '16, of the Institute, while Dr. Harvey W. Cushing, the eminent surgeon of Boston, paid the tribute of the professions other than engineering. Dr. E. W. Rice, Jr., Honorary Chairman of

science, engineering, and education, the chronicle progressed. Of all this much has already been presented in The Review. (See President Compton's article "An American Faraday" in the January, 1931, issue.) Despite inexorable space limitations, however, we wish without discrimination to quote from two tributes, Drs. Cushing's and Bush's, because they set in relief aspects of Professor Thomson not emphasized in these columns before. SAID DR. CUSHING:

"I HAVE been requested to speak in behalf of the professions other than engineering. This is embarrassing for a doctor, for though Medicine has been said to be the mother of the sciences, they have usually



John B. Sanroma

The above pictures and those on the opposite page were taken during Auguste ("Stratospheric") Piccard's visit to the Institute on March 21 when he spoke to the Faculty Club in Walker Memorial. On the left, Professor Piccard is shown looking at the photographer through a Zeiss 8-power Turmon vest-pocket field glass. This remarkable instrument weighs only $3\frac{1}{2}$ ounces, and Professor Piccard finds use for it on all occasions. Right: Godfrey L. Cabot, '81, Governor of the National Aeronautical Association and member of the M. I. T. Corporation is talking with him. President Compton is on Professor Piccard's right

the Board of Directors of the General Electric Company and its former President, an early associate of Professor Thomson, made an address which left no doubt of the affection and admiration of the inventor's friends and colleagues.

Professor Dugald C. Jackson, Head of the Department of Electrical Engineering, who was Chairman of the committee on arrangements for the celebration, voiced his own tribute and read some of the hundreds of messages of congratulation and tribute.

One after another the speakers unfolded the panorama of Professor Thomson's life, a career of more than half a century in the service of industry, to which he has contributed more than 700 inventions. There were glimpses of his boyhood in Philadelphia, the home of his youth after coming from his native England at the age of six. Childhood experiments, far advanced for his age, were described. Then came the years of his education, his career as a teacher, and his first, and fundamentally important, inventions of electrical machinery. He was to move later to Connecticut, there to learn some of the hard lessons and disappointments of business. Then came the establishment of the electrical industry in Lynn, Mass.

From the memories of friends of his youth, from the records of his achievements and from his colleagues in

left her, when grown up, to make their own independent way in the world. The best she can do under the circumstances is to breed more; and being prolific, this she continues to do. Meanwhile, being busily engaged in what is more an Art than a Science, she scarcely pretends to know how her scientifically minded descendants have grouped themselves, much less what mischief they are up to under their individual names.

"There are those twins, for example, that have just been here, one terrestrially minded, the other stratospheric, but just which one is Auguste and which one Jean (see pictures above) she is not quite sure. And then there are the Comptons which she has learned to differentiate as H. V. and C. R. — High Voltage Compton and Cosmic Ray Compton — and this, after all, is not so difficult for her to remember. But when it comes to identifying all the Elihus, mostly surnamed Thomson but sometimes Thomson-Houston, that's another kettle of fish altogether.

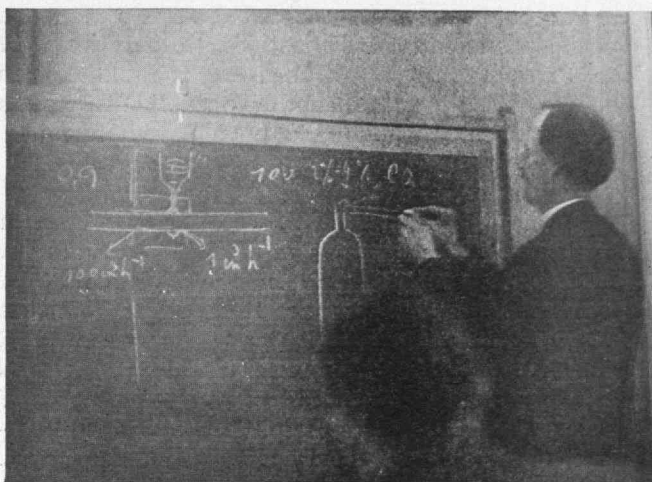
"What may be the relation of E. W. (Electric Welder) to E. L. (Electric Lighter), to C. T. (Current Transformer), P. T. (Power Transmitter), to Q. F. (Quartz Fuser) to Aurora B. Thomson and to M. I. T. Thomson, to mention but a few of them, it's now impossible for almost anyone to say. Of one of this superfluous lot, sometime known as H. F. A. C. Thomson, mention will sub-

sequently be made if advancing time and contracting space permit. The only thing known about the Thomsons as a clan is that in memory of Roger Bacon's tutor, Peter Perigrinus, who is the family saint, every newborn child cuts his teeth on a loadstone or a spool of wire, or on both at the same time; and as a consequence, the continued activity of the U. S. Patent Office is easily explained.

"Who the original three-coil and biphas Thomas or Thom may have been, whose sons have so often inherited these same spool-of-wire tendencies, is unrecorded, but I strongly suspect the gene is traceable to that particular lowland valley which breeds more natural philosophers and engineers to the square inch

Paget of Aberdeen could not be pacified with a spool of wire, so he was taught to pass electricity through gases instead. And later on the same Sir J. J. discovered a small negatively charged particle in the atom — with which the speaker at this moment feels in perfect accord. In short, there appear to have been no end to these Thomsons, and when they weren't natural philosophers, they were poets or musicians or something else — even doctors.

"Still, I strongly suspect that after all there may not have been so many of them as would appear. For they may well enough have assumed different names when variously occupied. And this may conceivably account for all these local Elihus, who some day may come to be



John B. Sanromá

Left: Professor Piccard is shown drawing diagrams upon the blackboard with both hands during the course of his lecture before the Faculty Club at M. I. T. In his lecture he discussed the possibilities of the stratosphere airplane and contended that stratosphere flying presented no insurmountable difficulties. Right: Professor Piccard with his brother, Jean, who from 1926 to 1929 was a member of the Staff at Technology. This remarkable series of "candid-camera" pictures was taken by Mr. Sanromá without the use of any lighting other than that normally in the room. Obviously there was no posing

than any other; namely, the valley of the Clyde, whence Manchester can be reached in what for a Scot is a two days' walk. But these sons of the first Thomas have scattered farther afield than Manchester and it doesn't take a paleontologist to identify specimens in most remote parts of the world.

"Even in such a surprising place as Woburn, Mass., there cropped up a certain Benjamin who, in a life dedicated to the relation of heat and friction, changed his name to Rumford, founded the Royal Institution, picked out Humphrey Davy to run it, and found it cooler and less frictionable to abide there with him than to keep house with the widow of Lavoisier. Another who similarly changed his cognomen was William of Glasgow, simply bursting — as would be expected from his chosen place of nativity — with heat, electricity, and magnetism; but in course of time, in order to differentiate himself from his no less gifted and highly charged brother, James, he felt obliged to adopt the name of Kelvin.

"And there was Charles Wyville of the Challenger deep-sea expedition, Joselyn Home the electrical engineer, James the mathematician, James Park the geographer, Robert, who first made use of India rubber for tyres, and Thomas the chemist, and John Miller another, and Joseph John of Cambridge, whose son George

conveniently expressed by a single formula — Baron of Lynn and Swampscott. This suggestion at least was made both by Count Rumford and Lord Kelvin when they passed their family medals on to him. And when Michael Faraday in turn bequeathed his, to the Elihu of a given epoch, he admitted privately that his own name was Thomson back on the distaff side; for how else could he legitimately have come by that easily recognizable spool-of-wire gene?

"And not to be forgotten in this genealogical survey is the late Sylvanus P., who is more addicted to p's than most Thomsons, but the fact that he produced sundry technical works on electricity, including a treatise on dynamo-electric machinery and the electromagnet, beside writing a life both of Faraday and of Kelvin, serves unmistakably to identify him with the clan. The reason he should not be overlooked by the representative of the professions other than engineering, who chances to address you, is because he has taken pains to point out that the sire of the twin sciences of electricity and magnetism happened to be a doctor.

"For William Gilbert of Colchester, Physician to Queen Elizabeth and much else, was almost the first to cultivate the method of experiment and reasoning from observation. He has been justly called the Father of Electric Science for his discovery (*Continued on page 314*)

THE INSTITUTE GAZETTE

Dr. Lowell to Make Commencement Address

DR. A. LAWRENCE LOWELL, President of Harvard University and a Life Member of the Corporation of Technology, will make the commencement address at the Institute's 66th graduation ceremony on June 6.

It is particularly fitting that Dr. Lowell, who at the end of this academic year retires after a distinguished administration at Harvard, should make this year's commencement address. As an active member of the Corporation for many years and through his administration of the Lowell Institute School, of which he is sole trustee, Dr. Lowell has shown an enduring interest in the Institute and its affairs.

Alumni Placement

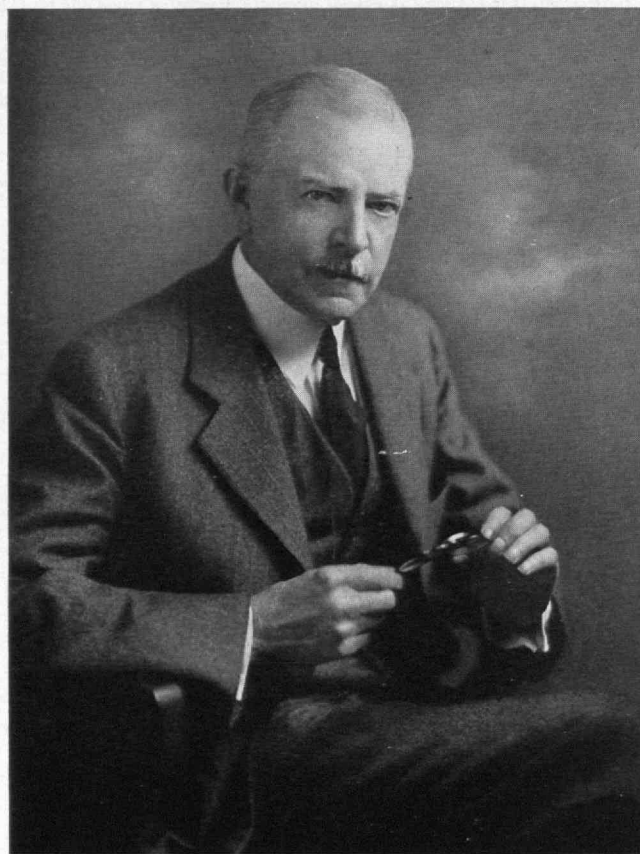
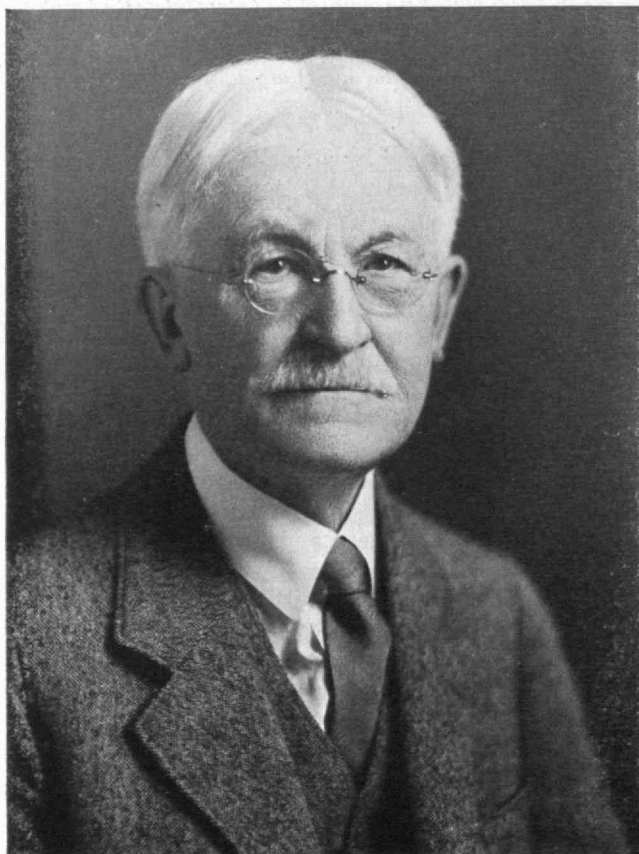
THE Personnel Office of the Division of Industrial Coöperation is making every effort to broaden the contacts between the Institute and industrial concerns. These contacts afford an opportunity to explain the Institute's activity in placement work and direct attention to the broad experience of Technology alumni in various fields.

Openings for technical graduates of proven ability showed a marked increase last month, but in spite of the large number of men on the available list, the Personnel Office was handicapped in filling several important positions requiring specialized training because of insufficient information as to the experience of qualified graduates.

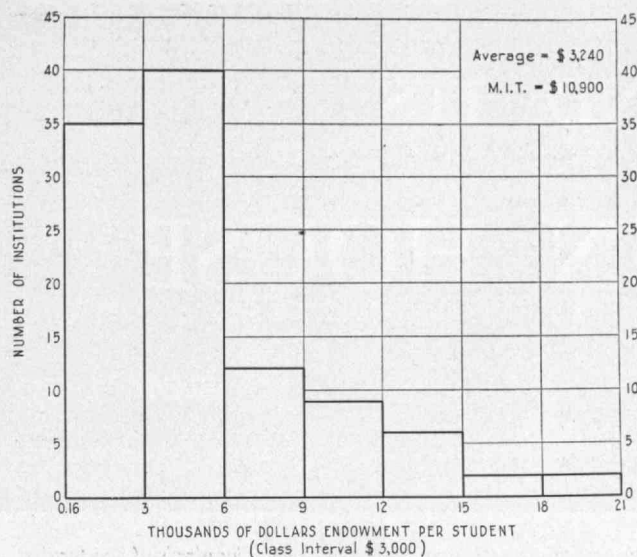
Any Technology alumnus interested in a new connection should send in a complete record of his experience so that he may be considered a possibility for such openings as his experience justifies. Registration with the Personnel Office will increase the individual's chances of getting located and help the Institute in its task of reducing the number of unemployed alumni.

Retirement of Drs. Dewey and Lindgren

DR. DAVIS R. DEWEY, who has long been in charge of the Department of Economics, and Dr. Waldemar Lindgren, Head of the Department of Geology at the Institute since 1912, will retire at the end of the academic year, it was announced in April. Dr. Hervey W. Shimer, Professor of Paleontology, has been appointed Acting Head of the Department of Geology, while Professor Ralph E. Freeman will become Acting Head of the Department of Economics.



Dr. Davis R. Dewey (left) and Dr. Waldemar Lindgren (right) who retire at the end of the academic year. See above



Professor Charles M. Spofford, '93, who is in charge of the Department of Civil and Sanitary Engineering, has been granted leave of absence for the coming academic year.

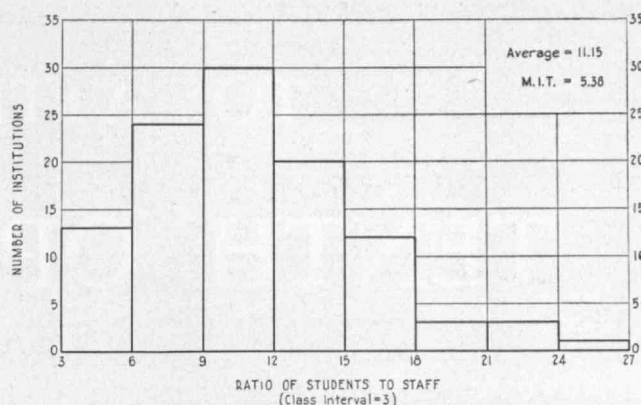
Dr. Dewey and Dr. Lindgren have had long and distinguished careers in education and in public service in their particular fields. The former has been a member of the instructing staff of the Institute for 46 years, and head of his Department since 1893. He is internationally known as an authority on economics, education, and social welfare, and has been honored by numerous appointments to state and national commissions in the service of the public.

A brother of John Dewey, the eminent philosopher and psychologist, he is also an author and educator of note. Born in Burlington, Vt., in 1858, Professor Dewey was graduated from the University of Vermont in 1879 with Phi Beta Kappa honors. After teaching for several years in the public schools, he entered Johns Hopkins University as a graduate student, and in 1886 received his doctor's degree in economics. He was awarded the honorary degree of doctor of laws by the University of Vermont in 1910.

Dr. Lindgren is recognized as one of the most distinguished authorities in the fields of mining and economic geology. Before joining the staff of the Institute in 1912, he was chief geologist of the United States Geological Survey.

He was born in Sweden and received his early education in that country. In 1883 he was awarded the degree of mining engineer from the Royal Mining Academy at Freiberg, Germany. In 1916 he received the honorary degree of doctor of science from Princeton University. He lectured at the Institute from 1908 to 1911, and has held the William Barton Rogers professorship of economic geology since 1912, when he was appointed Head of the Department. Dr. Lindgren is the author of a volume on "Mineral Deposits," and has contributed many articles on mining geology to government and technical journals. His home is in Brookline, Mass.

Dr. Hervey W. Shimer, now Professor of Paleontology, who will be Acting Head of the Department next



Analysis of statistics for 106 American colleges and universities having endowments of two million dollars and over during the year 1931-1932 (from 1933 "World Almanac"). The chart on the left shows the number of institutions having varying amounts of endowment per student. The Institute falls in the middle group. The chart above is a frequency distribution of the group with respect to ratios of students to staff. The Institute falls in the first group

year, is noted as an educator and author in the field of the earth's geological history. He joined the Technology staff in 1903 as an instructor in paleontology.

Dr. Shimer is a graduate of Lafayette College in the Class of 1899, and received his degree of master of arts there in 1901. He was awarded the degree of doctor of philosophy from Columbia University in 1904, and the following year conducted advanced studies at Harvard. In 1916 he was the recipient of an honorary degree of science from Gettysburg College, which he attended from 1891 to 1893.

His literary works include: "An Introduction to the Study of Fossils," "An Introduction to Earth History," "Evolution and Man," and, with A. W. Grabau, "North American Index Fossils." His home is in Hingham, Mass.

Professor Freeman, who joined the Institute Faculty in 1931, gained his early education in England. He was graduated from McMaster University in Canada in 1914, and two years later was awarded a Rhodes Scholarship which enabled him to carry on advanced

To the Alumni.

The Committee on Graduation exercises and Senior Week extends a cordial invitation to the Alumni and their guests to attend the President's Reception to the Graduates on Tuesday afternoon, June 6, from three-thirty to five-thirty in the Walker Memorial.

Refreshments will be served from tables with departmental designations arranged in alphabetical order under the balconies. It is believed that the Alumni in the vicinity will appreciate this opportunity to attend one of the functions of Commencement Day and renew acquaintance with the Faculty and fellow alumni.

The laboratories of the Institute will be open for inspection from two to four on the same afternoon. The Alumni are thus enabled to maintain contact with both personnel and equipment.

R. G. HUDSON, '07, Chairman
Committee on Graduation
Exercises and Senior Week

INVITES YOU AND YOUR FRIENDS TO ATTEND ITS TENTH OPEN HOUSE

SATURDAY MAY 6 - 1933

CAMBRIDGE, MASS.

FROM 2 TO 10 PM

Electrons traveling at a speed of 300 million miles per hour and bombarding thin metal films will be one of the hundreds of spectacular experiments performed for visitors at the pageant of science and engineering on Open House Day at the Institute on Saturday, May 6. The electron apparatus, constructed by Dr. George A. Morton of the Department of Physics, introduced electrons into a 60,000 volt high-tension discharge where they are accelerated to the inconceivable velocity of 300 million miles per hour, or one-third the speed of light. At this tremendous speed the particles impinge upon a very thin film of gold and are diffracted into cone-shaped beams which can be observed by means of a fluorescent screen. In this latter phenomenon the electrons behave just as if they were waves.

A similar experiment with a low-voltage discharge was the first experimental proof that particles of matter had a wave nature. The diffraction of these very high-velocity electrons is of great scientific interest, because it shows that particles are diffracted in a way analogous to the diffraction of x-rays. The whole process is a new means of studying engineering metals and is expected to be of value in the investigation of properties of metallic surfaces and of oil and grease films on bearing surfaces

studies at Balliol College, Oxford. He also studied for two years at the University of Chicago, where he was granted a fellowship in the Department of Economics. He has specialized in economics, history, and philosophy, and for six years was Head of the Department of Economics and Political Science at the University of Western Ontario. He is the author of "Economics for Canadians."

In addition to this teaching, Professor Freeman has had wide experience in business. In 1921 and 1922 he was financial representative of the Mauthner-Rawnsley Syndicate in Czechoslovakia, and in 1929 was associated with Otis and Company in Cleveland. Professor Freeman saw active service on the western front during the World War.

During Professor Spofford's absence, Professor Charles B. Breed, '97, will serve as Acting Head of the Department of Civil and Sanitary Engineering. Professor Breed has held a professorship of railroad and highway transportation at Technology since 1906, and is widely known as a consulting engineer.

165th Council Meeting

ON March 27 the Alumni Council held its annual joint meeting with the Faculty Club of the Institute. After the customary dinner, Vice-President Harrison P. Eddy, Jr., '17, opened the meeting in the absence of President Allan Winter Rowe, '01. Charles E. Locke, '96, Alumni Secretary, reported the election of Gorham Dana, '91, to the Nominating Committee in place of Donald G. Robbins, '07, resigned, and of Messrs. Charles A. Sawyer, Jr., '02, and Roger W. Wight, '01, as Council representatives for the Tech-

nology Clubs of Chicago and Hartford, respectively. He called attention to the fact that the May meeting has been set ahead one week to May 22 and he reported that visits to local clubs were made by Dr. Tryon in March to Philadelphia, Harrisburg, Pittsburgh, Louisville, and Indianapolis; that Dr. Rowe and the Secretary had visited Hartford on March 17; and that during the latter part of March and the early part of April, Dr. Rowe was visiting Baltimore, Washington, Philadelphia, Cincinnati, Niagara Falls, Buffalo, and Rochester.

After hearing the Secretary's report, Vice-President Eddy then turned the meeting over to Professor Murray P. Horwood, '16, President of the Faculty Club, who in turn introduced the guest speaker of the evening, Dr. Harvey N. Davis, President of Stevens Institute of Technology, whose subject was "Who Should Study Engineering." Dr. Davis gave a very interesting account of the educational studies that had been made at Stevens. He pointed out that there was a field for trade schools, or technique training, as compared to professional schools; that engineering was a professional training and was still largely undergraduate training; that engineering training may well be put on the same broad basis as a liberal arts training.

Dr. Davis described their experimental summer school in New Jersey, where during a period of two weeks, high school juniors are given an opportunity to try themselves and to be tried, in order to determine their suitability for engineering education.

Dr. Davis's talk was followed by an interesting question and discussion period in which the following participated: Dr. Compton, E. B. Rowe, '06, Professor
(Concluded on page 318)



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STRAIGHT THINKING

(Continued from page 286)

was allocated by the engineers to hydroelectric developments was of such magnitude that with any reasonable set of assumptions the power cost was such as not to be competitive with steam at any great distance from the river. Such a result did not meet the political needs in the case and led to long discussions and questionable compromises until, now, it becomes possible for the advocates of the installation to announce St. Lawrence river power at a competitive price in New York City. All the assumptions necessary to arrive at such figures are not accepted by experienced utility executives as reasonable or safe, but they make a good story on paper.

Problems of this character have two aspects. One is the purely economic one which is generally such that reasonably accurate analysis is possible. I think we are justified in insisting that this aspect be thoroughly investigated on a factual and not a political basis before action is taken. The other aspect is quite different. It is social in character. It may be quite a proper function of government to provide certain utility and possibly other services at less than actual cost and to make up the loss through taxation. As a general proposition, I do not believe that it is, but that is not the point I want to make. If the government is to do such things the public should be given an opportunity to know how much of a loss it is expected to pay out of taxes and should make its deci-

sion on that basis. And, it should later be given an opportunity to learn from non-partisan sources the amount that is actually paid out of taxes.

Let us look for a minute at another peculiar set of phenomena. Not so long ago a lot of people bought stocks of various corporations at inflated prices. When the bottom dropped out of the stock market we did not assume that it was any business of the government to rescue these unfortunate gamblers. They had bought something for more than it was worth, frequently using credit of some form to cover part of the transaction. They had used poor judgment and should pay the consequences was the judgment of the country.

At and before the day of making such investments many farmers had purchased farms at inflated values or had mortgaged them on the basis of inflated values. Later the bottom dropped out of the agricultural market. Immediately we discovered that while speculation in Wall Street is reprehensible, speculation by farmers in farm lands is to be protected. Some thinking individuals even contend that we must write down the face value of the mortgage to preserve an equality between it and the value of farm products. We had no such suggestions respecting notes in banks when those notes had been used to buy stocks and bonds.

You may say there is a difference. There is one of degree but not one of kind in any basic sense. But let us go further. Certain European nations owe us large debts contracted at a time when money was much cheaper than it is now. Most of us have strenuously objected to according these nations treat- *(Continued on page 306)*

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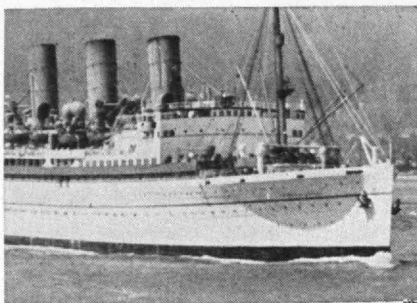
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STRAIGHT THINKING

(Continued from page 304)

ment similar to that we are advocating for our harassed farmers. If it were not all so terribly serious it would be really ludicrous. Certainly a bit of thought of the engineer's type might profitably be applied to some of these problems.

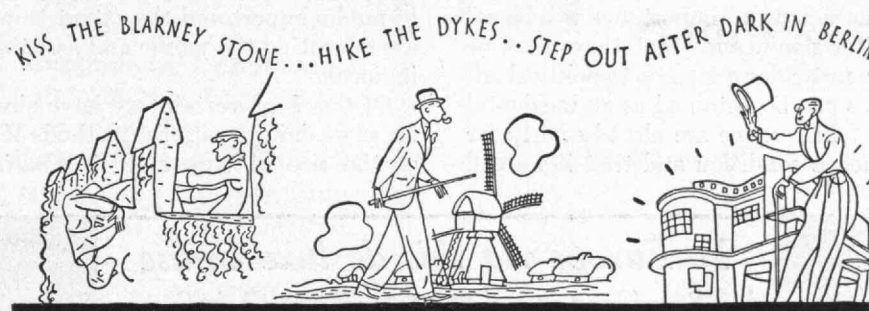
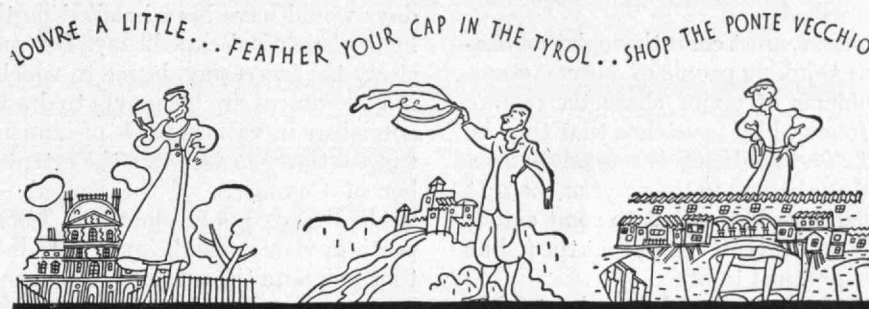
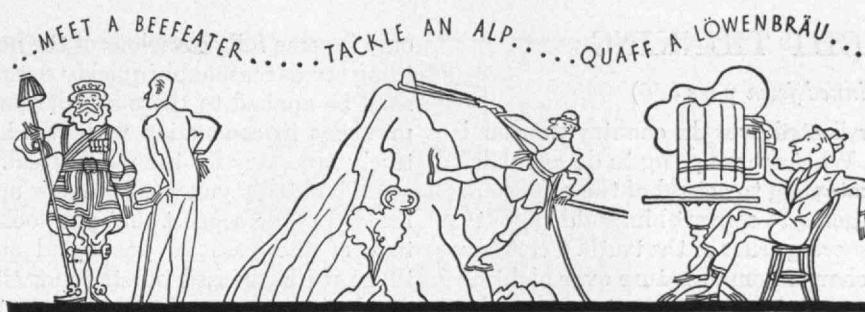
NOW you may well ask where all this is leading. You may be suspecting that I am going to suggest that the engineer should leave his present fields of endeavor and take over work in other fields that have commonly been tilled by others. This is far from my intention. There is much virtue in the old saying that the shoemaker should stick to his last. And I, for one, do not believe the engineer capable of solving all the problems of the modern social organization, the Technocrats to the contrary notwithstanding.

But, this does not mean that the engineer should apply his thinking process only to engineering problems and then travel with the mob in the consideration of problems which fall outside his field but the solutions of which affect him as they do others in all walks of life. The engineer, as an individual, is an integral part of the social structure. He is affected by laws controlling this and that; his welfare is intimately wrapped up with that of all other members of society; an industrial depression is as significant to him as to all others. A gradual disintegration of our democracy would affect him to the same extent that it would all other members of the community. He is a citizen and voter and thus charged with the responsibility not only of voting but of voting wisely.

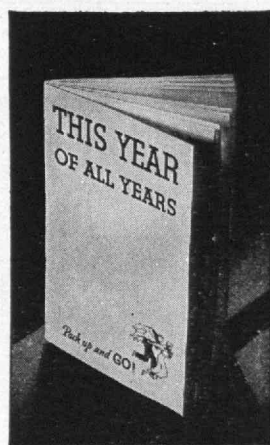
It is a fact that politicians can in general remain politicians only as they or those that they support are elected to office. And it is also a fact that through the ages the successful politician has usually owed his continued success more to catering to mob psychology and class consciousness or class prejudice than to the wise and beneficent handling of the problems that he professed to be solving. It is easy to arouse the ire of the mass against the supposedly heartless and money-gorged steam railroad or other large corporation and to persuade the mass to vent that ire in the passage of highly restrictive laws, provided one is not bound to call attention to the fact that the payment of insurance on the health and lives of that same mass is in no small measure dependent upon the continued financial integrity of the same large corporation.

It is easy to persuade the mass to confiscate the private property of the wealthy in order to reduce the taxes of the poor, provided one does not have to tell the mass at the same time that this is equivalent to dispersing the capital goods upon whose continued existence the wages and lives of the poor depend.

The politician will undoubtedly be always like this. He must be. But, unless I am much mistaken, our civilization has changed recently and rapidly to such a type that purely political handling of our larger problems for political ends must lead to disastrous results. Governmental units are too well interlocked, distances are too greatly reduced, industry is too closely knit, interests are too common to permit the purely political handling of our larger problems. Things move so rapidly these days that a major error (Continued on page 308)



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STRAIGHT THINKING

(Continued from page 306)

made today may be reflected over the country or around the world tomorrow. What are we going to do about it?

Certainly we are not going to get rid of the politician. Certainly we are not going to convert him suddenly into an unselfish, party-ignoring teller of the truth. Certainly we are not going to change human nature over night or even in a few years. Certainly we are not going to be able to educate the masses to the solution of problems which baffle even the wisest.

If improvement comes, it must come through a realization on the part of the thinking people of our communities that certain problems of major character require different treatment, followed by insistence that they be given such treatment. The politician is a sensitive soul when it comes to sensing changes in the ways or thought of the public and experience shows that to some extent he can be trusted to keep hands off things that the public insists shall be free of political taint.

I am satisfied that it is possible to bring about fairly expeditiously a condition of affairs in which certain problems of major character and importance will be accepted as of such vital significance that they must be handled without any particular reference to political advantage except as this can be obtained as an incidental by-product. In fact, I believe we are already fairly far along the road to such a condition and that if we will

only become fully conscious of the need, we can push the thing across reasonably quickly so that straight thinking shall be applied to those social, economic, and political problems in connection with which its use is imperatively necessary for the public weal.

Undoubtedly you want to know upon what I base this belief. Let me suggest that you look back over the history of the past 20 years and ascertain how many times we have used outstanding citizens either as individuals or as committees to carry through negotiations or to study and report upon problems which in early days would have been handled partly or wholly in the light of political expediency. Let me suggest that you study the increasing degree to which the better leaders in government are beginning to draw in, as consultants, specialists in various fields of human endeavor. Let me suggest that you ascertain the extent to which the Chamber of Commerce of the United States has recently studied large public questions from as nearly a non-partisan view as can be maintained. Let me suggest also that you note the extent to which competent specialists in many broad fields of human endeavor have taken to the preparation of popular discussions of live questions of public import and the extent to which such treatises are educating the public and assisting it in formulating its ideas.

Of this I am certain; we have already gone about as far as we dare go with the methods of the past. No public of the size of ours and of *(Continued on page 310)*

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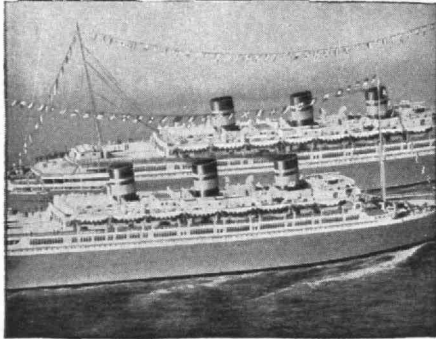
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STRAIGHT THINKING

(Continued from page 308)

the character of ours can, unguided, develop the wisdom required for the solution of the major problems of this phase of the current civilization. Nor does experience show that, in any general sense, those we elect to office have the wisdom, or possibly even the intelligence and education, necessary to enable them to study large public questions exhaustively, to say nothing of assisting their public in acquiring the viewpoints and information required for reaching correct solutions. Nor does experience lead to the belief that if we adhere to present methods, we shall succeed in electing better men to office in sufficient numbers to produce radically better results.

I can see only one promising way out and that is the way I have indicated. It will come into effective operation just as soon as a sufficient number insists that straight thinking underlie action and legislation dealing with large questions of major character.

YOU who are engineers are by nature endowed, and by education equipped to do straight thinking in your chosen field. As such, you are gifted above the average and you are in position to recognize better than any other single group a failure to use similar thought processes in other fields. I do not for one minute assume that many of you know or will ever know enough outside the field of engineering to enable you to think through to true solutions the complex social and economic problems that beset modern civilization. But I believe it safe to assume that many of you have developed and will continue to use mental processes that will enable you to do two important things. These are, first to recognize your own ignorance with respect to the facts and proper solutions of many questions of public import and second, to differentiate between illogical, partisan, and emotional treatments on the one hand and logical, non-partisan, and scientific treatments on the other.

Others cannot be taught this method quickly. In fact, few outside the fields of science and engineering appreciate that there is such a method available. How then is the engineer to utilize the advantage that his peculiar discipline gives him? Certainly not by attempting to solve the problems himself and certainly not by attempting the impossible education of the politician or the mass of the public in his methods. What then?

First, I would urge upon you a more complete and effective realization of your twofold capacity; that of an engineer and that of a citizen. Second, I would urge that you recognize that the proper discharge of your obligations as a citizen is just as important in the long run as your engineering activities, possibly even more so. Third, I would urge that, in your capacity as a citizen you attempt to apply your engineering type of thought and attack to the public questions that are up for discussion and decision. Fourth, I would urge that you take the time to determine whether proposed actions and solutions are really based on ascertained fact or represent merely the results of emotional reactions or guesswork or political expediency. Fifth, I urge that you do what you can to bring to public attention those cases of

real importance in which the necessary facts have not been determined and published before action is taken. And, sixth, I urge that you do what you can to influence those you contact who have not been trained in the same rigorous school of thought so that some of them may ultimately be brought to realize that there are better, safer, and surer ways of handling public affairs than those now most generally employed.

I would not have you become crusaders. I would not have many of you give up your engineering activities to become questionable public leaders. I would but have you do your duty as citizens by giving a proper proportion of your time and of your special training to the careful consideration of public questions and of their correct solutions. The onward progress of our civilization is going to be achieved either through straight thinking or through accident or through a combination of both. I prefer the maximum possible amount of the straight thinking ingredient; it is certain to be more expeditious and less wasteful in the attainment of results.

In closing let me caution you with regard to one thing. The social structure is made of human beings and, of necessity, it must continue to be so constituted. It is possible to imagine all sorts of marvelous social organizations capable of achieving all sorts of marvelous results provided only that one may at the same time ignore the characteristics of human beings. I have noted that many self-appointed architects of the social structure overlook the necessity of building something that is consistent with the characteristics of the building materials available. Do not fall into these errors. Straight thinking in matters social and economic requires that, among other facts, one recognizes that one deals with human beings with all their good and bad, consistent and inconsistent, lovable and hateful attributes. The actions of democracy are the statistical result of the effects of all sorts of stimuli upon these sensitive and erratic organisms.

Whether democracy survives and develops into that which its advocates contend it can, will, to my mind, be determined by the extent to which mechanisms are worked out and used for the production of the proper stimuli. All that I have said in this article boils down to an exhortation to use certain special qualifications which you have as engineers to increase the degree and extent of stimulation in what I believe to be a highly desirable and promising direction.

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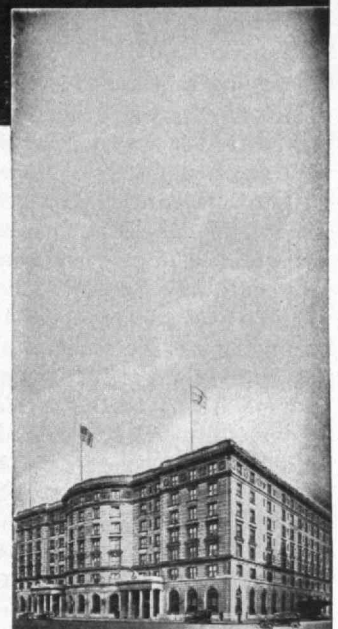
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PHYSICS AT M. I. T.

(Continued from page 291)

1895 a new unit added to the Rogers Laboratory for instruction in physico-chemical methods. This laboratory was started at the suggestion of Goodwin, then recently returned from Ostwald's Laboratory in Leipsig — which at that time was the Mecca to which students interested in physical and electrochemistry flocked from all parts of the world. The physico-chemical laboratory developed later into the present Electrochemical Laboratories. While it was not expected that the course in Electrochemistry (or Electrochemical Engineering, as it has been designated since in 1917) would attract a large number of students owing to the specialized character of the industries for which it prepared, a larger number than was anticipated have elected it. At present there are 280 graduates including 23 who have taken their Master's degree and two who have made their Doctor's degree. Many have become prominent in electrochemical industries and industrial research laboratories, and as teachers in universities and technical schools.

In 1916 the Institute moved from Boston to its present site in Cambridge. When it was decided that all departments were to be housed under one roof rather than in a group of separate buildings, the planning of the new Rogers Laboratory became a problem to the solution of which the staff of the department, consisting at that time of Professors Cross, Goodwin, Derr, Norton, Drisko, Thompson, Comstock, and Page, all contributed. As described in the catalogue of that year the Rogers Laboratory of Physics comprised the following units: The second-year Laboratory of Mechanics, Optics, and Heat; The second-year Electrical Laboratory; The third-year Electrical and High Frequency Laboratories; The Laboratory of Heat Measurements; The Laboratory of Technical Heat Measurements; Laboratories allotted to Optics, Photography, Photometry, Spectroscopy, Radiation, and Electrical Discharge in Vacua and Radio Activity; The Laboratory of Chemical Physics; The Laboratory of Electro-chemical Measurements and the Laboratory of Applied Electrochemistry.

The equipment of these laboratories and the character of the instruction given in them have of course been greatly extended and modified during the past seventeen years but the general plan and layout of the laboratories have remained essentially unchanged. Additional laboratories for investigation in the field of X-rays and of Electronics have since been added. These laboratories collectively constitute the present Rogers Laboratory of Physics. It was proposed some years ago that a tablet be placed in the present buildings recording the essential facts connected with the founding and naming of the laboratory in honor of President Rogers. This happy suggestion has now been carried

out and a bronze tablet has been placed in the vestibule of the East entrance to the laboratory from the Eastman Court bearing the inscription

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And Was First Developed

In This Institution

When Professor Cross retired in 1917 he was succeeded as head of the department by Professor Edwin B. Wilson. Professor Wilson administered the Department for five years when he resigned to join the Staff of the Harvard School of Public Health as Professor of Vital Statistics. During this time he also acted as Secretary of the Administrative Committee of the Faculty, appointed after the death of President Maclaurin. Under his administration the work in Aeronautical Engineering was placed in charge of the Department of Physics. Prior to 1921 the instruction in this subject, which was first introduced as graduate work in 1914 by Professor Cecil H. Peabody, '77, was given in the Department of Naval Architecture. Professor Wilson took an active part in developing this work, himself giving one of the most advanced courses in the mathematical theory of the subject. In 1926 the four-year course leading to the Bachelor's degree in Aeronautical Engineering was established, this being the third course outside of Physics proper for which the Department has stood sponsor. With the completion of the Guggenheim Laboratory of Aeronautical Engineering in 1928, the work in Aeronautics was transferred to it and has since been administered by an organization of its own.

After the resignation of Professor Wilson in 1922 Professor Charles L. Norton, '93, professor of Industrial Physics, took charge of the Department, at the same time acting as Director of the Division of Industrial Coöperation and Research. His many contacts with industry were of great assistance in placing graduates of the department who had elected their work with industrial physics in view. Prior to the present depression the call for men in the industries who were well trained as physicists was greater than could be filled. During Professor Norton's administration the curriculum in Physics was revised with the view of allowing greater latitude in the choice of studies according to whether the student planned to prepare for an academic or industrial career. Graduate work in the field of Ceramics was also initiated.

The necessity of providing adequately for research in science if the Institute was to maintain its leadership and particularly if it was to develop its graduate work, was strongly emphasized by President Stratton when he came to the Institute in 1923. During his administration facilities were provided and every encouragement given to those interested in fundamental research, not only in the pure sciences but in engineering projects as

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well, to a far greater extent than at any previous time in the history of the Institute. To provide adequate facilities for the Departments of Physics and Chemistry the building now occupied by the George Eastman Research Laboratories was planned. It is pleasant to recall that Dr. Stratton, then Chairman of the Corporation, had the satisfaction of laying the cornerstone of this laboratory with President Compton, a short time before his death on October 18, 1931. That he could not have lived to take part in the dedication of this laboratory to the creation of which he had devoted so much thought is profoundly regretted by everyone.

With the prospect of the new laboratory well under way in 1930, Dr. John C. Slater of Harvard University was appointed Head of the Department of Physics. The Staff in the Department was then greatly enlarged and strengthened by President Karl T. Compton, by the appointment of men distinguished in the field of theoretical and experimental physics. As now organized the Staff falls naturally into the following divisions:

The Institute of Theoretical Physics — Director, Professor John C. Slater.

Experimental Physics — Director, Professor G. R. Harrison.

Industrial Physics — Director, Professor C. L. Norton.

Electrochemistry — Director, Professor H. M. Goodwin.

The most cordial coöperation exists between the Departments of Physics of the Institute and Harvard University. The weekly colloquia and seminars at each institution are open to the staff and graduate students

of the other. A more eminent group of physicists than is now represented here in Cambridge at these two institutions probably does not exist in the country. The immediate result of these developments in Physics at the Institute has been a greatly increased attendance in the Graduate School as well as in the number of students electing Physics as undergraduates. At present there are 95 undergraduates pursuing courses for the Bachelor's degree, nine for the Master's degree, and 29 for the Doctor's degree.

Such, in brief, has been the history of the Department of Physics.

The Rogers Laboratory of Physics was established 64 years ago. It will continue to provide for instruction in all branches of undergraduate Physics — for which it was primarily established — and to offer facilities for research in classical physics and its applications. The George Eastman Research Laboratories for Physics and Chemistry will be devoted primarily to research of the staff and of students in the Graduate School. The aim of Professor Pickering, the creator of the Rogers Laboratory, has at last been fulfilled to a degree probably undreamed of by him, for, upon relinquishing his work in 1877, he said

"The great object to which my work for the last ten years has been directed has been original investigation. This is the real goal to which the attention of a student in the physical laboratory is directed. . . . I have endeavored to impress on all our students in Physics the principle that original investigation should be the great aim of every scientific man."

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The Institute publishes a variety of bulletins, fully descriptive of individual courses, as well as a catalogue of general information essential to the entering student. The Technology Review Bureau will be glad to send, gratis and post free upon request, one or more copies of any publication listed below, or to forward any special inquiry to the proper authority.

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AIRSHIP AUDIT

(Concluded from page 294)

CREDITS

building. A satisfactory, chemically treated fabric has replaced the costly goldbeaters' skin as material for the gas cells, and the wastage of helium has been almost eliminated. The cost of a commercial ship the size of the *Akron* and *Macon* should be somewhere between \$1,500,000 and \$2,000,000.

Finally, on the question of the vulnerability of airships in thunderstorms, it should be possible even in the present state of development of the science of meteorology to avoid such situations.

Three important developments have been effected in the field of meteorology during the past 15 years which have greatly improved the possibilities of accurately forecasting thunderstorm conditions. One is the great increase in the number of reporting stations in the various weather bureaus. That of the United States has added over 500 special airways stations. Another is the development of the polar front theory with its attendant frontal analysis and its application to the art of weather forecasting. The last is the greatly increased data on the upper atmosphere now available for forecasting purposes. This data is secured from daily soundings by airplane at an increasing number of stations and the now universal use of frequent pilot balloon observations. If these trends can be continued somewhat longer, and can be extended to include the improvement of the maritime reporting system, the transoceanic Zeppelin can not only avoid dangerous conditions but can even take advantage of what is seemingly adverse weather.

The giant rigid airship is one of the boldest engineering projects ever undertaken by the human race. It is inconceivable that, just on the threshold of permanent commercial and military utility, it should be abandoned.

DEBITS

airway with its network of weather stations. A further discouraging fact is that structural failure seems to have occurred to some extent before the *Akron* struck the water. The airship proponents seem at last to be caught in a position entirely without alibi.

There is considerable opposition, now on the increase among heavier-than-air authorities, to the idea that the airship will continue to stand unrivaled in the fields of long-range scouting and transoceanic air travel. Pan-American Airways, for one, has had the faith to invest extensively in surveys of transatlantic routes for seaplanes and is proceeding with the construction of several giant flying boats to be operated on the route to Europe via Bermuda and the Azores. A large portion of the officer personnel of the Navy has consistently argued for the use of large patrol seaplanes for coastal work and the increase of the number of our aircraft carriers for sea scouting and for much more general operations with the fleet than an airship is capable of. It would be their argument that the cost of an airship should not be compared with that of surface vessels, but rather with that of heavier-than-air craft. It must also be remembered that the scouting potentialities of almost every surface vessel in the Navy have been tremendously increased by the now standard airplane stored on her deck. They would point out that, 15 minutes after the *Los Angeles* reported the fleet off Panama, it was "destroyed" by an airplane squadron operating off an enemy carrier.

The airship program has been continued only at an ever-increasing cost of men and resources. It is inconceivable that the risks to men and resources should be continued.

THE TREND OF AFFAIRS

(Continued from page 299)

that the power of a loadstone could be augmented by 'arming' or capping it with soft iron, which he called the *armatura*. And after a lifetime of experiments, just 333 years ago, and shortly before his death from the plague, he finally published the results of his studies in that epochal book in which the novel idea was first advanced that the globe of the earth is itself a great magnet. And while Gilbert spoke of electrifiable bodies as *electrics*, it was another doctor, Sir Thomas Browne, who for the first time, 46 years later, coined and used the word *electricities*.

"So the mention of Sylvanus P. Thompson brings us back again to Medicine, the mother of the sciences, and to a certain High Frequency Alternating Current Thomson already mentioned. That this might be the same Thomson under some other initials to whom Medicine was already in debt for his contributions to the new science of Röntgenology seemed likely enough. But as there was some uncertainty about this, a letter was addressed to H. F. A. C. Thomson, Esq., of Lynn, Mass., telling him that he might be interested in the

application of various cutting, dehydrating, and coagulating currents to the art of surgery, more particularly as facilitants to operations on the brain.

"The sender ventured to say that he ordinarily did not permit laymen to witness operations. Only once had this rule knowingly been broken, in the case of the poet, Walter de la Mare, who was curious to see what the living brain of a conscious patient looked like when exposed to view. No wheels or bats were demonstrable in that particular attic, only a tumor, and the poet, while expressing interest, had shown by his demeanor a certain measure of disappointment. But the electrical engineer, who was partly responsible for what is called electro-surgery, might well feel differently about it, and he was welcome to have a private look if he desired. The letter was returned from Lynn saying that there was no H. F. A. C. Thomson there any longer. There was a Q. F. Thomson who was busy squirting molten quartz on a mirror and who said he didn't recall H. F. A. C.'s address, and never thought much of him anyhow.

"So you can easily see how difficult it is for a person representing all the other professions to speak intelligently and authoritatively of (Continued on page 316)

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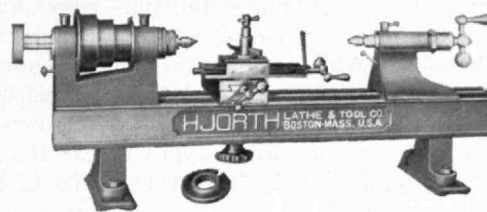
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THE TREND OF AFFAIRS

(Continued from page 314)

the manifold and shifting interests of an electrical engineer, particularly when his name is Thomson — as it usually is and always should be — and more especially when he alternates from one field of research to another with such astonishingly high frequency. And also how embarrassing it is for an after-dinner speaker to realize that one of these Elihus — quite possibly the one here — not only is familiar with more types of gas than will be turned on tonight, but also invented the first muffler or silencer, which by this time he probably wishes he'd brought with him.

"But when we actually come to fuse all these Thomsons of our immediate vicinity and to get a composite picture of them, it becomes quite evident that the resultant Elihu is one of those rare men who transcend their own chosen walk in life and who belong to us all. It is not their genius alone which is responsible for this, however rare a gift genius may be and however much it may be envied and admired. It is only when genius is combined with those equally precious qualities of modesty, unselfishness, and simplicity — the imponderables of high character and lovable personality — that there emerges from the common herd, from time to time, an occasional man whose life symbolizes for the rest of us, whatever our profession may be, something as nearly perfect as one could hope to attain in this fallen world."

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THE TREND OF AFFAIRS

(Concluded from page 316)

are now professor of applied electricity, and you have been organizer, inventor, man of business, engineer, astronomer, executive, philosopher. In these days when there is a tendency to specialize so closely, it is well for us to be reminded that the possibilities of being at once broad and deep did not pass with Leonardo da Vinci or even with Benjamin Franklin. Men of our profession — we teachers — are bound to be impressed with the tendency of youths of strikingly capable minds to become interested in one small corner of science and uninterested in the rest of the world. We can pass by those, who through mental laziness, prefer to be superficially and casually interested in everything. But it is unfortunate when a brilliant and creative mind insists upon living in a modern monastic cell. We feel the results of this tendency keenly, and we find men of affairs wholly untouched by the culture of modern science, and scientists without the leavening of the humanities. One most unfortunate product is the engineer, who does not realize that, in order to apply the fruits of science for the benefit of mankind, he must not only grasp the principles of science but must also know the needs and applications, the possibilities and the frailties, of those whom he would serve. There are students who may realize this fallacy only when it is too late. To those we would say: 'There is one of your professors to whom we would call your attention. He exemplifies that combination of breadth with a definiteness of grasp of the affairs of this world to which we may humbly aspire. He has made significant advances in many diverse branches of engineering, represented by many inventions relating to such things as the uniflow steam engine, the lightning arrester, the cream separator, the electric meter, the resistance welder, x-rays, the automobile muffler, the use of helium in diving, the heat treatment of steels, and various chemical processes. He has written of such matters as the nature of comets, the light of the firefly, and the aurora. He has organized and guided business, and one of the great electrical companies of the world bore his name. He has many, many friends. May some of you follow in his distinguished footsteps that the world may be brighter and more replete with the opportunity which comes with material advance! May you make many friends, as he has, that those who inherit these benefits may know and understand each other better! May you grasp his kindly philosophy, that you may be happy as you create!'

"I bring you, sir, not only the salutations of your colleagues, but also their heartfelt gratitude that you have dignified and enriched the title of professor and that we may hail you as friend and colleague."

THE INSTITUTE GAZETTE

(Concluded from page 302)

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M. I. T. NEWS BULLETIN

PREPARED BY JOHN J. ROWLANDS, DIRECTOR, INSTITUTE NEWS SERVICE

Cold in the Sky

The daily flights of the Institute's aerological research plane to altitudes of more than 18,000 feet above New England have revealed amazing differences in temperature between the ground and upper air levels. On the official first day of spring, Lieutenant Henry B. Harris, research pilot, encountered a temperature of 27° above zero Fahrenheit at a height of 11,000 feet. In this flight he encountered sleet, rain, and heavy clouds.

The second coldest day of 1933 in the upper air was recorded on March 29, when the instruments fastened under a wing of the plane registered 36½° below zero at an altitude of 19,300 feet. The ground temperature at the same hour was 38° above zero, a difference of 74½°.

The coldest day of the year encountered by the pilot was in February, when the thermometer registered 37½° below zero high in the clouds.

Records of altitude, barometric pressure, and temperature, as well as observations on cloud levels, ice formation, and visibility are made on these daily flights from the East Boston Airport. Lieutenant Harris leaves the ground early in the morning for a flight which usually lasts more than an hour. Often he is flying blind by the aid of instruments.

Notes from the President's Office

President Compton's activities during March included attendance at notable scientific and civic gatherings in Boston, New York, Washington, and Chicago.

On March 11 he delivered the Joseph Henry lecture before the Washington Academy of Science, speaking on the subject of high voltage. During his stay in Washington, he was the guest of the Technology Club of that city.

At a dinner tendered Albert Einstein by scientists, educators, and philanthropists at the Hotel Commodore in New York, Dr. Compton made an address of greeting on behalf of American scientists.

The following week he appeared before the Massachusetts legislative committee on labor and industries to urge the passage of a bill providing for a system of unemployment reserves, a measure in which he has long been interested.

Dr. Compton attended sessions of the American Association for the Advancement of Science, held in Chicago.

On Exhibition

An exhibition of drawings, including sketches, etchings, lithographs, dry points, and other expressive forms of the

work of John Taylor Arms '11, Samuel Vance Chamberlain '18, Louis Conrad Rosenberg '13, and George Canning Wales '89, was held at the School of Architecture of Technology from April 8 to 15.

These four artists have achieved conspicuous success in their various fields. Mr. Arms is widely known for the excellence of his draughtsmanship and the pure lines of his etchings and aquatints. The beauty and technical knowledge displayed in etchings and lithographs of ships and the sea have won for Mr. Wales a wide reputation.

Samuel Chamberlain has studied etching in this country and abroad, and many examples of his work in Europe reveal a full appreciation for the beauty that time alone can bestow. In 1928, Mr. Chamberlain studied etching processes abroad under a Guggenheim Fellowship.

Mr. Rosenberg is known for the soft beauty of the architectural drawing displayed in his etchings of scenes here and in Europe, where he has studied under Malcolm Osborne, A.R.A., of the Royal College of Art.

Improvement in Scholarship

A distinct improvement in the scholastic standing of undergraduates at the Institute was indicated in the announcement of the names of 725 students who achieved high records in their studies during the first term. The list of high scholastic standing shows a numerical gain of 87 over the first semester last year, as well as a decided rise in the percentage of each class included.

Students whose standing entitled them to a place in the first rank constitute 3.3% of the freshman class, 4.4% of the sophomores, 3.5% of the third year men, and 4.3% of the Class of 1933.

In the second group are 11.3% of the first year students, 9.4% of the sophomores, 10.6% of the juniors, and 8.8% of the senior class.

Included in the third group are 15.7% of the Class of 1936, 15.4% of the second-year men, 19.4% of the juniors, and 20.9% of the seniors.

The scholastic records of a limited group of freshmen admitted last fall without examination, on the basis of outstanding work in their secondary schools, bettered the average of those freshmen admitted by College Entrance Board examination.

For Unemployment Relief

A check for \$500, representing contributions from the undergraduate body of Technology, was recently donated to

the Cambridge fund for unemployment relief. Presentation of the check was made by Richard L. Fossett, Jr. '33, President, and Robert G. Holt '33, Treasurer, of the Institute Committee, to Mayor Richard M. Russell of Cambridge and Professor Edwin H. Hall, who received it as representatives of the relief committee.

A similar contribution of \$500 was made by Technology students last year.

Waves and Wave Motion

The significance of the wave-nature of matter, which makes possible human sight, hearing, and systems of long-distance communication, was described by Professor Francis W. Sears '20 in the final Society of Arts popular science lecture at the Institute.

Speaking on "Waves and Wave Motion," he demonstrated by striking experiments the various properties of waves which explain such phenomena as radio interference, why the sky is blue and sunsets red, and why one can hear, but not see, around a corner.

Of the vast scale of electro-magnetic waves, ranging from radio waves hundreds of meters long down to gamma rays of 1/1,000,000,000th of a centimeter, and possibly even shorter cosmic rays, the human eye can detect but a small portion, Professor Sears said.

With a long coil spring, he showed the nature of compression and transverse waves, and wave trains. He demonstrated how the interference of two wave trains of light produced bands of darkness—in sound, areas of silence, and in liquids, regions of quiet. The brilliant colors seen in oil film and soap bubbles are due to this interference of light wave trains, the speaker explained. He showed how the overtones in a musical string resulted from the interference of a reflected with a fundamental wave.

If light waves were many times longer, one could see around a corner, Professor Sears declared. Their minute size, however, prevents their bending more than an infinitesimal amount around the edges of an obstacle. Sound waves, being comparatively long, are diffracted to a correspondingly greater degree.

The blue color of the sky was attributed to the tendency of light waves to be scattered by dust particles and air molecules, and transmitted to the earth. Blue waves scatter more easily than those of other colors, and in the tremendous distance light from the setting sun must travel before it is transmitted from the air to the earth, most of the blue waves are scattered out, leaving yellow which gradually turns to red.

The atomic theory of a few years ago of ball-like electrons whirling around a positive nucleus has been generally superseded, Professor Sears said, by a conception of electrons vibrating about the nucleus in the manner of a violin string. He predicted that the theory of the wave-nature of matter will play a vital part in the future of physics.

Gift of Books

A valuable group of books on city planning will come to the library of the School of Architecture of Technology through a financial grant from the Oberlander Trust of New York. These books have been assembled by Mr. Carol Aronovici, who is now abroad studying housing and other related interests for the Oberlander Trust.

This collection of books is considered of exceptional value because of the steadily increasing need for full consideration of the problems of city planning.

Honors Examination Committee

The selection of a committee of five members to formulate and administer the comprehensive examination for honors group students of the class of 1933 was announced recently by the Department of Electrical Engineering.

The committee includes Professor Paul Cloke, Dean of the College of Technology, University of Maine; Joseph W. Horton '14, formerly Chief Engineer, General Radio Company; A. H. Sweetnam, Superintendent of the Electrical Engineering Department, Edison Electric Illuminating Company; Professor Carlton E. Tucker '18, and Professor Karl L. Wildes '22 of the Institute's Department of Electrical Engineering.

Designed to cover electrical engineering as a professional field rather than as a series of individual subjects, the honors group examination consists of problems framed to test analysis, judgment, and the understanding of principles, rather than memory. The questions are of a semi-project nature involving combinations of various principles such as are found in actual practice. In order that the answers may be the result of reflection and mature thought, approximately two weeks are allowed for their preparation, during which time reference is permitted to texts, handbooks, periodicals, and other desired sources of information.

Sunday Concerts

The series of Sunday afternoon concerts which were inaugurated so successfully last spring by the Combined Musical Clubs of Technology were repeated this year before capacity audiences in Walker Memorial.

The Little Symphony Orchestra, organized at Technology this winter, gave its first public performance at the concert on March 19. A feature of the program was the first presentation in Boston of "Pageant Scene," the composition of Arthur G. Farwell '93.

The two programs were sponsored by the Dormitory Board and the Faculty Club of the Institute.

Honored

In recognition of his work in textile research and instruction, G. Gordon Osborne, Textile Foundation Fellow, was recently advanced to an associateship in the British Textile Institute. During the past year Mr. Osborne has conducted studies in the micro-analysis of fibers under the supervision of Professor Edward R. Schwarz '23, Director of Technology's laboratory of textile microscopy.

Aldred Lectures

New methods of approach to problems of hydraulic construction were described by Carroll F. Merriam, General Engineer of the Pennsylvania Water and Power Company, in the third Aldred lecture of the year. Taking as his subject "Changing Conceptions in Hydraulic Engineering," Mr. Merriam emphasized the growing importance of experimentation and mathematical deduction in modern hydraulics.

A considerable part of the research leading to this new attitude of hydraulic experts has been conducted in Technology's laboratories.

C. F. Hirshfeld, Chief of Research at the Detroit Edison Company, discussed "Straight Thinking" in the fourth Aldred lecture on April 7.

Colloquia

Dr. Frederick S. Dellenbaugh, Jr. '21, President and Chief Engineer of the Delta Manufacturing Company, recently conducted the final colloquium of the year in the Department of Electrical Engineering, on the subject of "The Problems of Rectification and Smoothing of Alternating Currents."

Previous colloquia during the semester included a discussion of "Electric Furnaces" by N. R. Stansel of the General Electric Company, and an analysis of "Radio Frequency Transmission Lines and Terminations" by Dr. Paul B. Taylor '22, radio engineer of the Westinghouse Electric and Manufacturing Company.

Dr. Tryon Visits Colleges

Professor James L. Tryon, Director of Admissions at the Institute, spent the month of March among preparatory schools and colleges of New Jersey and Pennsylvania.

He visited the Newark College of Engineering, Princeton and Rutgers Universities, Drexel Institute, Dickinson College, Pennsylvania State College, the University of Pittsburgh, and the Carnegie Institute of Technology. His tour also included Louisville and Indianapolis, and ended at the University of Notre Dame. Dr. Tryon was the guest of several Technology Alumni Clubs along the way.

Stratosphere Flights

Professor Auguste Piccard, who in his balloon exploration of the stratosphere last August ascended to a height of 54,120 feet, the greatest altitude man has ever reached, spoke before the Faculty Club on March 21. Professor Piccard was accompanied to the Institute by his brother Jean, who several years ago was a member of the instructing staff.

Professor Piccard's address concerned the possibilities of the stratosphere airplane, a subject in which he has long been interested. He said that the problem of flight in the stratosphere presents no great difficulties. A plane capable of flight in the rarefied atmosphere 10 miles above the earth would require more powerful engines than are now available. The cabin for passengers and pilot would be airtight and the engine would be supplied with compressed air. He believed a speed of nearly 600 miles an hour could be reached at this height, making it possible to cross the Atlantic in a day. Professor Piccard said the stratosphere is free of clouds and wind, and that the color of the sky is a deep violet, with a visibility of 250 miles. He described the methods which would make it possible to supply passengers with fresh air during such a flight, and means for heating the cabin in an atmosphere which is far below zero at all times.

At the luncheon table were President Compton, Dean Vannevar Bush '16, Mr. Godfrey L. Cabot '81, a member of the Corporation, Dr. Murray P. Horwood '16, President of the Faculty Club, and Professor Frederick K. Morris of the Department of Geology.

Delta Omega Lecture

Dr. George F. McCleary, former Deputy Senior Medical Officer to the British Ministry of Health, delivered the sixth Delta Omega lecture at the Institute on March 30. Dr. McCleary, who is a past Medical Officer of the National Health Insurance Commission of the British Isles, discussed "The English System of Social Insurance."

Delta Omega is the national honorary fraternity of the public health profession.

Soaring

The Professor, high-performance glider of Technology's Aeronautical Engineering Society, will be entered in the national soaring competition this summer at Elmira, N. Y., according to a recent announcement by the managing board. The glider was rebuilt during the winter by members of the society, who hope to break existing altitude and distance records with the Professor in the coming meet.

A Franklin Utility glider was recently acquired by the organization for use in soaring instruction. A closed fuselage monoplane with a gliding ratio of 15 to one, it weighs approximately 200 pounds empty, and has a wing span of 36 feet.

ADVERSARIA

Congratulations

¶ To ARTHUR E. KENNELLY, Professor of Electrical Engineering at M. I. T., 1914-1925, on his election to the Presidency of the Metric Association at the recent national convention in Atlantic City.

¶ To GEORGE P. ABORN '86, of the Harvard Trust Company, on his election as President of the Cambridge Industrial Association on March 24.

¶ To GEORGE W. FULLER '90, on being named chairman of the Engineering Foundation, research organization for the senior national societies of civil, mining and metallurgical, mechanical, and electrical engineers. Mr. Fuller is a pioneer in the development of water purification systems for municipalities. He is a member of the firm of Fuller and McClintock of New York.

¶ To ARTHUR W. DEAN '92, on his recent election to the Presidency of the Boston Society of Civil Engineers. He is chief engineer of the Department of Public Works and a former President of the American Road Builders' Association. HAROLD K. BARROWS '95 was elected Vice-President of the society.

¶ To CHARLES E. SMITH '00, on his appointment as Vice-President in charge of operations of the New England Transportation Company and the County Transportation Company, highway subsidiaries of the New Haven railroad. He will also continue as head of the railroad's purchasing department.

¶ To LEWIS W. DOUGLAS '17, on his appointment by President Roosevelt as Director of the Budget. He was born in Arizona (which state he represented at large in the national Congress), educated at Amherst and M. I. T., and was once a member of the Amherst faculty. He was serving his third term in the House, where he has worked in close association with Chairman Byrne and Representative McDuffie, House whip, as a member of the House Economy Committee. He has been called the bicycling member of Congress because he takes his daily exercise by pedaling along the streets of Washington from his home to his office and back. Mr. Douglas's appointment is indicative of sweeping governmental economies.

¶ To ELISABETH COIT '19, on receiving honorable mention in the small-house architectural competition for 1932, sponsored by Better Homes in America.

¶ To KENNETH T. BAINBRIDGE '25, research physicist of the Bartol Research Foundation of the Franklin Institute, on his appointment to one of the John Simon Guggenheim Memorial Fellowships for researches on mass-spectra, at the Cavendish Laboratory, University of Cambridge, England. He is the author of important scientific papers in the field of nuclear physics and was for two years a Fellow of the National Research Council.

In the News

¶ DAVIS R. DEWEY, Professor of Economics, for being one of the 20 economists to sign an open letter to President Roosevelt urging settlement of the war debts, lowering of tariff barriers by reciprocal action, and maintenance of the gold standard as a minimum program for economic recovery. Lower tariffs on manufactured goods were recommended in order to admit additional imports of "diversified manufactures to take out our own agricultural and raw material exports," which it was felt would stimulate prices, purchasing power, and employment. America should encourage and facilitate the prompt restoration of the gold standard abroad, which settlement of interallied debts and tariff reduction will do. World stocks of gold were held adequate for all credit needs.

¶ THOMAS C. DESMOND '09, New York State Senator, for sponsoring the City Charter Bill, embodying the recommendations of Samuel Seabury following his investigation of New York City government. He recommended public hearings on the bill to bring out "merit or lack of merit" and that the bills then be acted upon by the Legislature. "I desire to be as courteous as possible to all concerned," he said, "but the bill was not introduced by me with any idea that I would let it sleep forever peacefully in committee."

¶ FRANCIS C. ATWOOD '14, of the Atlantic Research Associates, for his discovery of sour milk paint, described in the *Boston Transcript* as "the 1933 offshoot of the fresco work of some varlet of the Middle Ages who overturned a tub of sour milk, and with a rousing 'Ods bodkins' slammed some of the mixture of milk and clay against the castle wall." Mr. Atwood became known through his work on Craf-tex; and out of his research has come this new paint, specified for the interiors of the buildings of the Chicago World Fair. Casein has proved one of the most economical paint vehicles and is obtained from milk at the creamery, where the butter fat is separated from the milk and where the casein is precipitated out as curd. The curd is then shipped to a treating plant and the result is the casein for the new style paint. It takes 100 pounds of milk to furnish about three pounds of casein; for the finished paint, a half to three-quarters of a pound to the gallon. Mr. Atwood, who is Vice-President of the Federation of Paint and Varnish Production Clubs, says that we have not yet touched the surface of the country with paint and millions of gallons are needed to cover 20,000,000,000 to 25,000,000,000 feet of construction area which is not being painted at the present time.

¶ THOMAS M. SEARLES '17, on his resignation as general agent of the Aetna Life Insurance Company in New Jersey. Mr.

Searles is a naval architect and marine engineer by profession and during the War was a lieutenant commander in charge of construction of a large number of ships. After the War, he and his father opened a new general agency of the Aetna Life in the South, and in 1926 he became general agent for New Jersey.

¶ ARTHUR R. BROOKS '17, who with P. B. Findley took part in the first radio telephone contact between an airplane and a fishing trawler, from a "flying telephone laboratory," a tri-motored plane equipped with a radio telephone. Findley called New York, was connected with Green Harbor, Mass., where the call was "hooked up" by radio telephone. He talked with the captain of the boat for several minutes, reporting the conversation very clear and the experiment a complete success. Four miles from Stafford Springs, Conn., Mr. Brooks called the Boston Airport, making an appointment to meet Captain Edson, superintendent of the airport. This feat recalls a similar one achieved by Brooks in 1930 when he talked to the Technology Reunion Dinner in Boston from an airplane flying over New York.

¶ HAROLD G. CROWLEY '23, in the *Boston Transcript's* "Who's Who and Why?" of aviation column. He is probably the only flyer in the world, the article says, who has seen the two extremes in North America of the Atlantic Coast. He has flown over Key West, Fla., and over Cape Chidley, the doorstep to Baffin Land, and he has landed in a dozen or more sub-Arctic towns where planes had never been seen before. In 1929 and 1930 he was with the Marine Division of Curtiss-Wright at Boston, taking in \$8,200 during a period of two months. He is rated among fellow-airmen as New England's premier seaplane pilot along with Robert S. Fogg. He contributed an article to the February, 1933, Review on his experiences in mapping Labrador from the air.

Warship of the Air

¶ BERTHOUD C. BOULTON '16 has been in charge of the development of a new Martin Bomb Plane for the Army. The plane is particularly interesting because of the many radical structural and aerodynamical features involved. This new type plane is believed to be the most powerful military weapon produced since the War. While performance figures have been withheld, the plane is reported to be capable of carrying a full load of over 2,000 pounds of high-explosive bombs at speeds in excess of 200 miles per hour, a faster record than the best pursuit planes of today. On a flight from Dayton to Washington, the new bomber had to slow down in order not to outpace the pursuit planes accompanying it. A new type of air combat will necessarily evolve. The

one man, dog-fighting pursuit plane tactics will be transformed to a battle between parallel columns of multi-engined planes, with crews of three or more, concentrating machine-gun fire on each other as do battleships, or dropping bombs from above.

Mr. Boulton at one time did structural work for Fay, Spofford and Thorndike, turning later to aeronautical design, in which he has been engaged for a good many years. Other graduates in Civil Engineering who have taken active part in airplane design are: CHARLES J. MCCARTHY '16, chief engineer, Chance Vought Corporation; FRANK S. HUBBARD '17, chief engineer, Berliner-Joyce Aircraft Corporation; KENNETH M. LANE '17, XI, formerly chief engineer, Air Regulations Division of the Department of Commerce, Washington, now engaged in consulting aeronautical work in New York City; ALFRED S. NILES '17, Professor of Aeronautical Engineering, Leland Stanford Junior University; and JOSEPH S. NEWELL '19, Associate Professor of Aeronautical Structural Engineering at the Institute.

Scientists Select Leaders

¶ From more than 20,000 scientists and research workers, 250 have been selected by their colleagues as among the leading workers in their fields in the United States. The announcement appeared in the March issue of *Science*, official organ of the American Association for the Advancement of Science, of which Dr. J. McKeen Cattell is the Editor. He explains that as the names were chosen from more than 20,000, "each of them stands first among more than 80 research workers, a somewhat severe selection." The average age is 42.9 years. The distribution of the birthplaces of the country's distinguished scientists, it was found, is moving westward; New England has lost its supremacy in the production of scientific men; and the gains have been made especially in the Central West. Massachusetts and Connecticut have had in residence even more scientific men than they have produced, which holds also for New York and the District of Columbia. Three women were included in the list. The following men connected with the Institute are listed: GEORGE SCATCHARD, chemist; JESSE DOUGLAS and DIRK J. STRUIK, mathematicians; GEORGE R. HARRISON and PHILIP M. MORSE, physicists.

Who's Who

¶ According to a recent survey conducted by the Humanics Department at M. I. T., there are 937 Technology men listed in "Who's Who in Engineering" and 509 in "Who's Who in America," with 172 duplications. The "Who's Who in America" contingent has its center of population about the Class of '95. Tied for high place are '89 and '96, with 26 names apiece. "Who's Who in Engineering" is a younger man's book with the center of gravity of the curve about '07. The Class of '05 takes first place with 45 names.

Professor F. ALEXANDER MAGOUN, Secretary of the Class of 1918, has "examined the 1918 roster of immortals" in his class notes in this issue and invites other secretaries to send stamped, addressed envelopes if they wish lists of their famous classmates.

Warning

¶ An impostor is again at work acquiring easy money from Technology alumni by posing as Luis A. Ferre of the Class of 1924, this time in the vicinity of El Paso, Texas. Last summer he was working around Denver. Apparently he has acquired a Register of Technology alumni and perhaps a catalog, as he appears well acquainted with the school and names of the professors. The real Mr. Ferre is engaged in business in Ponce, Porto Rico, where he runs the Porto Rico Iron Foundry. Other alumni may be saved from being victimized by giving publicity to this man in all parts of the country.

Written

¶ By ROBERT F. ELDER, Professor of Marketing, an address on the subject "Can Radio Sell Goods?" delivered before the Advertising Club of Boston, January 18.

¶ By WILLIAM H. McADAMS, Professor of Chemical Engineering, a book entitled "Heat Transmission," McGraw-Hill Book Company, New York.

¶ By JOHN H. GREGORY '95, ROBERT A. ALTON '13, and JAMES H. BLODGETT '20, a paper entitled "Holding-Down Power of Concrete Piles," published in *Civil Engineering* for February, 1933.

¶ By L. MAGRUDER PASSANO, Professor in the Department of Mathematics, an article on "Macro-Cephalism" (in the world of science), which is not half so fearsome to read as it sounds and is many times as entertaining as it looks impressive, in the March, 1933, *Scientific Monthly*.

¶ By HARVEY S. CHASE '83, a report for the National Economy League entitled "A Critical Emergency in Federal Finance," accompanied by a table of figures and comments on what it has cost to run Massachusetts for the last ten years, with estimates for 1933. Mr. Chase is a certified public accountant and statistician for the League in Boston.

¶ By HIRAM P. MAXIM '86, a book entitled "Life's Place in the Cosmos," published in April by Appleton, in which he has much to say about Mars. Mr. Maxim invented the Maxim silencer for explosive weapons, adapted it to automobile mufflers and exhaust pipes, quieted the roar of Diesel engines, and has now developed a room silencer for hospitals, homes, and office buildings to keep out street noises. He was a pioneer in the field of wireless communication. He is President of the American Radio Relay League and of the International Amateur Radio Union.

¶ By GEORGE A. ORROK '89, a paper on the "Effect of the Decreasing Cost of Steam Degenerating Energy on the Future Transmitting System," at the February

meeting of the Metropolitan Section of the American Society of Civil Engineers, New York.

¶ By CLAYTON W. PIKE '89, a paper on "Distribution Cost of Electric Energy," presented at the first session of the Institute of Public Engineering, January 20, in New York. The conference was called by the State Power Authority in the hope of ultimately reducing rates to consumers by reducing distribution costs of electric power.

¶ By A. FARWELL BEMIS '93 and JOHN E. BURCHARD, 2d, '23, a book entitled "The Evolving House: A History of the Home," published by The Technology Press at M. I. T., April, 1933. This is the first of a series of three books under the general title of "The Evolving House" and is a popularly written account of the development of man's home from prehistoric times to the present time, taking into consideration the social and economic forces which have taken part in its gradual evolution.

¶ By FREDERICK G. CLAPP '01, an article in *Mining and Metallurgy* for February, 1933, entitled "Oil Concessions in the Middle East."

¶ By BENJAMIN F. C. HAANEL '01, "Peat: Its Manufacture and Uses," the final report of the Peat Committee appointed by the Dominion of Canada and the Province of Ontario.

¶ By JOHN J. DONOVAN '06, a book entitled "A Method of Procedure and Checking Schedule for Planning School Buildings and Their Equipment." Unlike his earlier book, "School and Architecture," published in 1921, it is more of a "schedule" than a "book," giving a wealth of detailed information concerning every aspect of school architecture. The conception of this book is considered unique and it should be of immense practical value to the architect.

¶ By ARTHUR L. SHAW '09, an article in *Engineering News-Record*, December 1, 1932, on Reclaiming the Zuider Zee.

¶ By WILLIAM A. RHODES '12, of the American Telephone and Telegraph Company in New York, a booklet on "Market Development," containing a brief explanation of the nature of money and of the advantages of business expansion, followed by practical methods whereby various forms of business may profitably be made to increase. A few of the many ideas suggested follow: "The way for a relief committee to support its dependents is to accept contracts for production and distribution on a competitive basis and to sell its products. It both aids the community and gives work to the unemployed. . . . In consequence of all of the foregoing, new markets presented for business lie largely within the lower strata. The goods and services desired by the people of these strata are in general considered obsolete by those of the high-wage areas, where are located the producers of the goods and the producers of mechanisms employed in giving service. . . . A representative of a factory living for a time in a low-wage district, acquainting himself with customs and existing purchases may discover it possi-

ble to make an article better than one now sold, which his plant is almost already adapted to manufacture profitably. Insulated wire is excellent as a hair-curler, to cite an extreme case." The pamphlet offers many ideas which might stimulate the jaded and depressed mind of today's tired business man. At least it offers a challenge to man's ingenuity.

¶ By T. C. HSI '15, a compendium showing dykes and other works constructed by the National Flood Relief Commission, China, 1932.

¶ By IRVING B. CROSBY '17, the first comprehensive official report on the mineral resources of Massachusetts for the Massachusetts Industrial and Development Commission at the State House. A summary of the report is given in the *Journal of the Engineering Societies of Boston* for April, 1933.

¶ By ARTHUR C. HARDY '18, a talk on "Colorimetry" to members and friends of the New England Section of the Illuminating Engineering Society when they were the guests of the Institute on March 31.

¶ By RICHARD W. SMITH '21, a paper entitled "Cyanite in Georgia — A Museum Mineral Becomes Commercial" in the December, 1932, issue of *Forestry-Geological Review*, published by Georgia's Department of Forestry and Geological Development.

¶ By FRANK MASSA '27, a paper on "High Quality Ribbon Telephone Receivers" at the joint meeting of the Institute of Radio Engineers with the American Association for the Advancement of Science at Atlantic City.

¶ A memorial volume on Boston entitled "Fifty Years of Boston," to which the following men connected with M. I. T. contributed: FREDERIC H. FAY '93, Chapter II on *Physical Changes*; PORTER ADAMS '14, the section devoted to the progress of aviation in the city which gave birth to Samuel P. Langley, maker of the first practicable airplane, in Chapter V, *The Foundations of Prosperity, Commerce, Industry, and Labor*; ROBERT E. ROGERS, Associate Professor of English, the section on literature in Chapter VI, *The Superstructure — Arts, Sciences, and Professions*; RALPH ADAMS CRAM, lecturer at M. I. T., 1914-1922, the section on architecture, also in Chapter VI; CHARLES M. SPOFFORD '93, Professor of Civil Engineering, the section on engineers and engineering, Chapter VI; ARTHUR A. SHURTLEFF '94, Chapter XIII, *Every Day Life in Boston: Its Changing Aspects*.

Deaths

¶ It is with regret that The Review Editors must record the death of a recent associate, Mrs. Eric Hodgins, *née* Catherine Carlson. For four years she was a valued member of The Review staff, and for the year prior to her marriage to Eric Hodgins '22, former Managing Editor of The Review, she was an Associate Editor. Her connection with The Review, plus the fact that she was the daughter of Harry J. Carlson '92, a Life Member of the Corporation, makes her loss more keenly felt by all Technology alumni.

¶ The following Technology men were on the *Akron* when she went down at sea on the morning of April 4: HAMMOND J. DUGAN, age 30, U. S. Naval Academy '24, M.S. at M. I. T. '32, of Catonsville, Md.; JOSEPH H. SEVERYNS, age 35, U. S. Naval Academy '19, M.S. at M. I. T. '32, of Port Angeles, Wash.; GEORGE C. CALNAN, age 33, U. S. Naval Academy '19, M.S. at M. I. T. '23, of Watertown, Mass.; HERBERT M. WESCOAT, age 32, U. S. Naval Academy '23, M.S. at M. I. T. '29, of McArthur, Ohio.

¶ RAYMOND E. A. C. PALEY, International Research Fellow at M. I. T., who was one of the greatest of the younger generation of mathematicians in England, on April 8, while skiing in the Canadian Rockies near Banff. He was graduated from Eton and from Trinity College, Cambridge, and since last fall had been conducting a joint research with Professor Norbert Wiener.

¶ WALLACE D. DEXTER '73, on March 6.

¶ ARTHUR W. FORBES '73, on February 11.

¶ CHARLES S. RACKEMANN '78, on March 29. After leaving M. I. T., Mr. Rackemann went to Harvard Law School, graduating in 1881, when he began practice in Boston. His work was largely in the nature of real estate conveyances and he was trustee of many estates. For some time after 1889 he was Vice-President and Director of the Conveyancers' Title Insurance Company, and he had been President and Director of the Stamp Savings Society of Boston. He was the author of "Land Registration Act of Massachusetts," printed in 1898, and "A Draft of an Act" designed to simplify and improve transfers of land and titles to land in Massachusetts, published in 1908.

¶ JAMES W. LAWRENCE '81, on April 3. Professor Lawrence was pioneer educator of the Colorado Agricultural college, having retired in 1917 as professor emeritus of the mechanical engineering department. He had long been a member of the Fort Collins Pioneer society and was serving as Treasurer of that organization at his death. The project with which Professor Lawrence closed his career, working upon it for two years before his retirement, was the construction of the heating system at the college, which was designed by him after careful study of heating systems of other schools throughout the country.

¶ EDWARD NICHOLS '82, on February 21. Mr. Nichols was a well-known Boston architect. He drew the plans for several public buildings in the city, including the Town Hall and Osgood School, and was instrumental in the designing of Fenway Court, the home of the late Mrs. John L. Gardner, now one of Boston's museums.

¶ RICHARD H. PIERCE '85, on March 16. (See class notes for account.)

¶ WILLIAM H. BLOOD, Jr. '88, on February 13. (See April class notes for account.)

¶ ARTHUR H. GOULD '91, on February 7.

¶ HARRY W. JORDAN '91, on March 14. (See class notes for account.)

¶ FREDERICK L. RHODES '92, on March 18. (See class notes for account.)

¶ WILLIAM F. CRAIG '95, on January 29. Mr. Craig was a state chemist and former attorney, state senator, and postmaster of Lynn.

¶ ALPHONSUS L. DRUM '96, on March 17. Mr. Drum started his business career as an engineer in Boston, moving to Chicago in 1904 to form the consulting and constructing firm, A. L. Drum and Company. During the War he was consulting expert to the United States Shipping Board and the United States Housing Corporation. In 1914 he made a study of the traffic in Times Square, advocating in his report the construction of subsurface passageways for pedestrians. He went to Detroit in 1925 to make a survey for the receivers for the Detroit United Railways, remaining as President of the Eastern Michigan Railways, which succeeded the Detroit United Railways. Mr. Drum was a Fellow of the American Institute of Electrical Engineers.

¶ EDWIN D. PINGREE '96, on February 1. (Account in April class notes.)

¶ ERNEST R. SPRINGER '98, on February 19. (Account in April class notes.)

¶ MELVILLE R. DAVIS '99, on November 13, 1932.

¶ HARRY G. JOHNSON '99, on February 26.

¶ BURTON S. CLARK '00, on February 16.

¶ HORATIO W. STEBBINS '02, on February 2. (Account in April class notes.)

¶ LOUIS C. WINSHIP '05, on March 2. (Brief account in class notes.)

¶ ALFRED E. TAGDELL '05, on March 12. Mr. Tagdell was connected with the bond department of the Old Colony Trust Company for 27 years and was assistant manager of the Bay State branch of the First National Bank at the time of his death.

¶ SYLVANUS W. WILDER '06, on September 28.

¶ RALEIGH D. MORRILL '07, on March 11. Since 1926 Mr. Morrill has been associate professor of experimental engineering at New York University. He was formerly professor of mechanical engineering at the University of Minnesota, where he took two masters' degrees. He also had been engaged at Norwich University in the Department of Electrical Engineering and at the Popular Science Institute, where he was a research worker on refrigeration. Professor Morrill specialized in research in thermodynamics as well as refrigeration, his achievements in both fields winning widespread recognition from fellow-scientists. He was in charge of the classes in thermodynamics at New York University's college of engineering. Before becoming a member of the faculty, he had served as consultant to leading refrigeration companies.

¶ WALTER D. REED '08, on January 23.

¶ GEORGE H. PIERCE '08, on February 12.

¶ WILLIAM T. BIEDLER '10, in March. Mr. Biedler had been with the Gas and Electric Company for 23 years and of the past ten years had been manager for the Customers' Investment Department.

¶ R. SHIELDS MCCLINTIC '29, on March 20, on a winter vacation trip in Huron Mountains, Mich. He became exhausted during a mountain blizzard and died from exposure.

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

Technology Club of Hartford

Technology-in-Hartford has had a good year so far, and the prospects are bright for a fine wind-up at the June outing. Up to the present writing, we have met five times for dinner and our speakers have been good lively ones, hard to catch or trip up.

Professor William B. Bailey, Yale '94, of the Travelers Insurance Company, told us in November of his first-hand experiences in a research into the question of what is a hobo and, if you know, what do you do about it anyway. The talk was very apropos, and no doubt many of us have benefited by it during the past winter. Professor Bailey said that any panhandler ought to net from five to ten dollars a day, except right after Christmas, and one good fit à la shaving cream is worth five dollars alone. All interested scientists and experimenters are hereby warned against the flavor of certain widely advertised soaps.

Professor Hudson B. Hastings '07, Head of the Section of Applied Economics at Yale, addressed our club in December and explained how sometimes when everybody does the right thing, they are all doing the wrong thing. His clear discussion of the factors influencing economic depressions was long to be remembered for the light it shed upon many things we wondered about.

In January we had a bowling dinner and in February we heard from Brigadier General Sanford W. Wadhams, Yale '94, who told us of the difficulties encountered by our soldiers when they first occupied the Philippines. The Insurrectos fixed the floor on hinges and planted bamboo spikes underneath.

On March 17 Professor Charles E. Locke '96, Alumni Secretary, drove over from Boston with Dr. Rowe. We had an evening combining progress at the Institute with abnormalities of the endocrine glands, and it was thoroughly enjoyed by all. Dr. Rowe brought along a box full of lantern slides wherein were preserved for our startled vision many curious manifestations of ductlessness. The physical aberrations presented to our eyes were exceeded in interest only by Dr. Rowe's polysyllabic lucidity in their interpretation. Professor Locke announced Dr. Rowe's candidacy for membership on the Corporation together with his platform including adoption of the night-blooming cereus as its flower instead of the century plant, and the candidacy was enthusiastically endorsed by all present.

That is the sum of our year to date. In spite of the times our attendance remains normal, and it warms the Secretary's

heart when dinner is a little late to see the membership lined up in a queue reaching away down the block almost to the employment agency. We have several unemployed members and find next to nothing to do for them. If anyone who reads this notice has any ideas on how to deal with the problem, his least suggestions will be received with appreciation. — THOMAS D. GREEN '26, *Secretary*, 40 Westfield Road, West Hartford, Conn.

New Haven County Technology Club

A meeting of the club was held on January 26 at the Naugatuck Y. M. C. A., at which about 19 members were present. Mr. R. E. Benham, of the Risdon Manufacturing Company, spoke to us on the manufacture of safety pins. Mr. Halpin, of the Seymour Manufacturing Company, spoke on the subject of "The Practical Man Versus the Technical Man." H. G. Manning '12 gave an interesting talk on patents. Coffee and doughnuts were served and a general discussion was held. — MARSHALL S. WELINGTON '16, *Secretary*, 60 Holcomb Street, West Haven, Conn.

M. I. T. Club of Northern California

At the annual meeting held at the home of Captain J. J. Thomas '07, the following officers were elected: President, Colonel George R. Norton '07; Vice-President, R. A. Folsom '18; Secretary, F. W. McLaren '25; Assistant Secretary, C. E. Harrington '23; Treasurer, D. D. Donald '25; Members of the Executive Committee at large, J. J. Thomas '07 and C. G. Hyde '96.

Approximately 45 were present and after the short business meeting we enjoyed a movie showing scenes in Alaska and more particularly the salmon packing industry supplemented by a talk by Mr. Ben Hart, who took the pictures over a period of 10 or 12 years. Light refreshments after the program gave opportunity for general intermingling and sociability.

We believe that the unemployment sheet sent with every mailing has proved of some value. Several inquiries have reached the Secretary with relation to these applicants, and it would appear that there is more activity in this field than formerly. Correspondence relative to employment should be addressed to the new Secretary, 369 Pine Street, San Francisco.

The regular Tuesday luncheons at the Engineers Club, Pine and Sansome Streets, are increasingly well attended. They are the nucleus around which other activities of the organization are formulated and we sincerely invite every

alumnus here to attend when possible. — ROLFE A. FOLSOM '18, *Retiring Secretary*, 150 Hooper Street, San Francisco, Calif.

The Technology Club of Rochester

On March 4 members of the club celebrated the change of management in Washington, or the closing of all the banks, or simply the occasion, with another dinner dance at the University Club. Two long tables in the college room proved more satisfactory than individual group tables as previously attempted. About 25 couples were present and enjoyed activities as long as possible. When the orchestra ceased playing, even more fun resulted from the impromptu band which evolved with a piano player and assistant musicians wielding most expertly the rungs of a chair and a few pieces of silverware. To this special music dancing continued for nearly an hour.

At the next meeting of the club on Friday, April 14, Dr. Allan W. Rowe '01 is expected to enlighten the group regarding contemporary M. I. T.

It has become necessary for me, at least temporarily, to give up active participation in the affairs of the Technology Club of Rochester. Howard S. Gardner, Jr., '30 is taking over the duties and pleasures of the Secretary. His address is Building 46, Kodak Park, Rochester, N. Y. — LAURENCE T. TUFTS '29, *Secretary*, Building 26, Kodak Park, Rochester, N. Y.

Rocky Mountain Technology Club

The club held its monthly meeting at the home of Dana Kepner '21, 1624 Adams Street, on March 15, 1933. Alvah Moody '17, President, has been working on trans-mountain water work at West Portal, Colo., for the Denver water board. Since it is necessary for him to be on the job all the time, he requested that someone be appointed to serve the remainder of his term of office. B. E. McKechnie '02 was so appointed.

B. J. Morritz, Jr., '32 has been recently experimenting with radio control. He described a model boat of his design which has been successfully operated in Denver on a small lake. Radio control in general was also discussed. The remainder of the evening was devoted to entertainment of a lighter nature. — Dr. Severence Burrage '92 has been appointed delegate at large for the Denver Health Council. — MAXWELL PARSHALL '28, *Secretary*, 926 Akin Avenue, Fort Collins, Colo.

The M. I. T. Club of Western Pennsylvania

The Club was pleased to have Dr. Tryon, Director of Admissions, as its guest for luncheon on Monday, March

20, 1933, at the University Club, Pittsburgh, Pa. The faculties of two of the Pittsburgh universities joined with us in greeting Dr. Tryon. The University of Pittsburgh was represented by Dean E. A. Holbrook '04, a member of our club; the Carnegie Institute of Technology was represented by Dr. Arthur C. Jewett, Director of the College of Industries, Alan Bright, Registrar, and Dr. James Aston, head of the Department of Mining and Metallurgy. Dr. Tryon gave us a fine talk after the luncheon. He spoke of his visits to other schools throughout the country, and then told us of some of the new policies and trends in the entrance requirements at the Institute.

Our Meetings Committee is now completing plans for the annual banquet, which is to be the last scheduled meeting of our spring season. Attendance at the weekly luncheons on Friday in McCreery's Dining Room has been very good. — S. J. HELFMAN '24, *Secretary*, 435 Sixth Avenue, Pittsburgh, Pa. C. M. BOARDMAN '25, *Assistant Secretary*, Duquesne Light Company, Pittsburgh, Pa.

Technology Club of Central Florida

A new organization has been recently formed by Technology alumni around Tampa. There are some 40 former students in the central Florida section and plans have been under way for some time to form a social organization. The officers elected at the first meeting are: Harvey M. Mansfield, President; Walter N. Munroe, Vice-President; Malcolm R. McKinley, Secretary-Treasurer; with Charles F. Kuhn, of Winter Haven, completing the board of governors. Others present in addition to the officers were: Franklin O. Adams, J. K. Ferguson, Richard D. Jackson, Max J. Mackler, J. D. Mendenhall, W. B. Newell, Harry B. Wesson, all of Tampa, and Paul Winsor, of Bradenton.

(Concluded on page xxvii)

CLASS NOTES

1883

In response to an S.O.S. call sent out to members of the class, replies have come in favoring the meeting at Hyannisport on Friday, June 2, adjourning to Boston in time for the formal festivities of June 6. Gale, Bryant, Underwood, Eppendorff, Henry Kingsbury, Vose, Mansfield, Stevens, and Boyden are all in favor of being there with their better halves. The rest of the class are expected to come also on the theory that "silence means consent."

It is hoped that the Class of '83 and their wives, with as many of their children and grandchildren as can be rounded up, will all get together at the Gables at Hyannisport and spend two pleasant days together before the meeting in Boston where we all take part in the graduation exercises at Symphony Hall. The Secretary wishes to call attention to the fact that we don't hold Golden Anniversaries often and it is hoped we shall make a creditable and impressive turnout.

The following letter from Alumni Secretary C. E. Locke will give you all the details of our Boston celebration: "Dr. Compton is not here today so that I cannot secure first-hand information from him, but I have consulted with Dean S. C. Prescott, Head of the Biological Department, who in years past has had charge of the Fifty-Year Class, acting as special marshal for them on Graduation Day. Dr. Prescott feels certain that the program this year will be carried out in exactly the same manner as in years past, which means that the members of the Class of '83 will assemble in Symphony Hall in Boston about 10:30 A.M. to take part in the graduating exercises. They will be provided with caps and gowns for the occasion, and under the marshalship of Dr. Prescott will form a part of the academic procession, and sit with the Faculty and Corporation and other notables on the stage during the exercises.

"After the exercises are over, the custom in the past has been for the Class to attend a luncheon in the President's house, here on the Technology grounds in Cambridge. There is no question that Dr. Compton will wish to tender your Class this luncheon, just as he has given a luncheon to previous classes. I might add that this is a most informal and delightful affair. Mr. Darrow, who is Secretary of the Class of 1882, told me that last year his Class approached this luncheon with some misgivings, and with the fear that it would be a somewhat formal affair, but almost immediately they were set at ease, finding Dr. Compton to be a most gracious host. This luncheon need not be limited to men, because last year there were some lady members of the Class present, and also one or two lady relatives of the men. For example, I think that Miss Snow, the daughter of Walter Snow, who was Secretary of the Class of '82 for so many years, was one of the extra ladies.

"The foregoing covers all the formal functions for your Class. It will be, however, your privilege, if you so desire, to attend the President's reception and tea in the afternoon on Tuesday, June 6. This is given in Walker Memorial. Of course, you may also attend any other of the exercises in connection with graduation, such as the Baccalaureate sermon on Sunday, June 4, or the Class Day exercises in Walker Memorial.

"The custom of preceding classes has been to have some special observation of their own, such as a class dinner, or an outing, so as to have a celebration running over two or three days, and culminating in the graduating exercises on Tuesday. This, however, is a matter that is entirely your own concern, so that really the only official part of your program is that of the Graduation exercises, followed by the President's luncheon, on Tuesday, June 6.

"There is absolutely no distinction between graduates and non-graduates. Any member of the Class of '83 is most cordially invited to attend, even though that member might have been at Technology for only a single term, or may

not have been a regular attendant, but had been registered in the school of Mechanic Arts. In other words, the invitation holds for all names listed in the Register of Former Students under '83.

As a final reminder let me repeat the program which was sent you by mail: Friday, June 2, meet at the Gables, Hyannisport; Saturday and Sunday, June 3 and 4, be together and have our class exercises, talks, reminiscences, and so on; Monday, June 5, run to Boston where we spend the night; Tuesday, June 6, attend graduating exercises and President Compton's reception; Wednesday, June 7, scatter. We should have enough cars between us to transport most of the crowd to Hyannisport and back. Let's all get together and have a meeting we can remember as long as we live. — DAVID WESSON, *Secretary*, 111 South Mountain Avenue, Montclair, N. J.

1885

Dick Pierce passed away suddenly March 16 after a slight indisposition of a few days. This removes one of our most prominent members from the Class, one who was always active in promoting its interests and who was proud of his connection with it.

He was born in Woonsocket, R. I., November 20, 1860, and was graduated from Yale in 1882. He came to the Institute in 1883 and entered the first course in electrical engineering established in the United States. It was the pioneering era in the development of electric power and lighting and Dick's qualifications particularly fitted him for the part he was to play. Our recollection is that upon graduation he became associated with H. Ward Leonard '83, who had formed a company, Leonard and Izzard, and acquired the agency for the Edison system of electric lighting in the West. Later on, with Bob Richardson, he incorporated the firm of Pierce and Richardson, one of the earliest and most prominent electrical engineering concerns in Chicago. This was at a time when demand for electrical equipment was fast developing. They became consulting engineers for some of the large packing houses and railway companies, and played an important part in the development of electrical power and light systems in the Middle West. Later on they took Sam Neiler '88 into the firm which then became Pierce, Richardson, and Neiler. During this period Dick was appointed electrical engineer in charge of illumination of the World's Fair in Chicago in 1893, and he was chief engineer and member of the Jury of Awards at the St. Louis Exposition in 1904.

Dick retired and came east early in the century, locating in Newtonville. He associated himself with his old friend, Leonard Fowle, who was co-trustee with him in several estates, and did considerable business in real estate. Soon after he came to Boston he became interested in a new machine for making cordage, and as a result the Atlantic Rope and Twine Company was formed, of which he became Treasurer. Of late years, he has given considerable time to the business.

Although a Yale man who did not come with us until our junior year, he became absorbingly interested in Technology and the Class of '85. In Chicago he was active in making the Northwestern Association of M. I. T. a notable organization. He has had a prominent part in all of our five-year reunions here and on our Twentieth at Squam Lake, it was Dick and Bob (the "Magnum G-zabo") who planned the unusual program of that never-to-be-forgotten time. It was Dick who suggested and planned the striking military stunt at the great reunion of 1916, probably the most outstanding skit of the many memorable ones presented. During the War, when the Secretary was away in Washington, he carried on the work of that office most effectively.

Dick Pierce was a loyal friend, generous in thought and action. His father, an officer of the Civil War, who was killed in action, left a high record of carnage. Dick had this same quality although he was not easily aroused. He has left his gentle impress on all of us and we shall miss him.

He was married to Carrie de Zong Morrow of Green Bay, Wis., in 1891. She died in 1907. One son, Richard, of Santa Barbara, Calif., survives him. Members of the Class attending the funeral service were: Plaisted, Pratt, Schubmehl, Rawson, and the Secretary.

There are three interesting coincidences relating to the Secretary and the Class, one of which is brought up in connection with Dick Pierce. He was spending a week-end with Dick at River Forrest, a suburb of Chicago, and was introduced to an aunt. She said, "Why Dick, your father had a classmate by the name of Litchfield." My query came back, "Amherst?" "Yes." "Class of '53?" "Yes." Our fathers were classmates.

Another time Billy Spalding invited Tenney White and the Secretary to inspect his latest acquisition, The "King Hooper House," at Marblehead. It was a happy afternoon and old houses came up for discussion. The forebears of the Secretary had settled in Haverhill in 1640 and the patriarch, William White, built a substantial house there about 1680. This is still standing, in excellent preservation, and was properly described. Whereat Tenney White boomed out: "I guess my folks settled in Haverhill in 1640. My ancestor built a darned good house around 1680, and if you want to know, I own it!" Tenney was of the ninth generation and the house had never been out of the family. It was Cousin Tenney and Cousin Ike after that.

The third episode has to do with Jim Means. Jim, a neighbor at a class dinner, said something about Judge Marcus Morton. "You know Marcus Morton, Jim?" Jim said he ought to; he played with him as a boy in Andover. "Jim Means, there was always something intriguingly familiar about you. I used to play with Marcus Morton and Charley Farley, and Morry Farnham, and you in Andover, between the ages of three and nine!" And sure enough it was so. One

of the high spots of the Forty-Fifth Reunion at Ev Morss's was the trip we took to Andover, where Jim renewed acquaintance with the old landmarks, including the house where one named Smith wrote "My Country 'Tis of Thee," in which the Secretary once lived; the place where Uncle Sam Taylor, the austere principal of Andover Academy, used to visit my father, who was minister of a church there, around 1865; the home of Elizabeth Stuart Phelps (who wrote "Stepping Heavenward"); Pumps Pond, which Rev. Elijah Kellogg wrote into history and where, as the hero of submarine adventures, the Secretary earned a warm reception from my father at home — not a genial warmth, but concentrated on one particular spot. John Lyman who was with us, although an Exeter man, entered fully into the spirit of the occasion.

Artie Plaisted, formerly in charge of the lock at the Charles River Dam, retired last July, and is living in bachelor independence at 45 Munroe Street, Somerville. Artie has never said much about it, but we understand that most, if not all, of the intricate mechanism used in operating the lock is of his design. — Bert Pratt was reelected a director of Stone and Webster on March 23. The directorate was reduced from 21 to 14.

The *American Magazine* for March has an interesting account of the life work of Charlie Allen as a vocational teacher. It describes how, rather by accident, he became a teacher of science in the New Bedford High School as a temporary expedient, following the conventional teaching methods of the day. As interest in his work grew, he began to wonder what results his former pupils were getting from his teaching, and his investigations brought home to him the fact that the bulk of his pupils were being taught many things that they never used in after life and very few that they did use. At the end of 23 years, a new philosophy of education had been gradually built up in his mind. His theory is epitomized in a remark a locomotive engineer once made to him: "an educated man is a man who is onto his job." With the help of his friend, Edgar Hammond '73, a member of the school board, he opened night classes for workers in the school basement. In two years he had 700 students, and the teachers were mostly workers at their various trades. The mathematics was such as was more or less applicable to the particular vocation.

In 1909 Allen was made director of public vocational education in New Bedford, and day schools were opened for young students. In 1911 Charlie was appointed an agent to supervise vocational education throughout the State of Massachusetts, and when the World War broke in 1917 and thousands of trained men were quickly needed, he was pressed into service by the Emergency Fleet Corporation. He established training centers along both coasts and trained about 88,000 men. He is not only a great teacher but also a good organizer, and his blunt, informal manner of approaching his

subject, as well as his audience of workers, has made him a popular figure among them.

Since the War he has been a consultant to the Federal Board for Vocational Education, advising and assisting the directors of vocational schools throughout the country which receive federal aid.

The writer of the article says that Allen has been called the father of vocational education in America. He has been teaching men not how to pass academic examinations, but how to deal with life as it is lived today.

As this is being written (end of March), Arthur and Mrs. Little are at Palm Beach; Mr. and Mrs. Everett Morss are navigating the West Indies, and Ed and Mrs. Dewson are at Davenport, Fla. — ISAAC W. LITCHFIELD, *Secretary*, Twin Ash Farm, Medfield, Mass.

1887

The Class news since the last installment is limited to a call that the writer made on March 23 on a member of our class now residing in Andover, Mass. Learning a short time ago that Frank D. Carney, III, had taken up a residence in Andover, your Secretary motored up to see him and spent a very pleasant half hour or more discussing old times. Although in poor health, Carney is able to be up and around, and gets out when the weather is good. He would be very glad to see any of the boys who might be traveling in the neighborhood of Andover, where he can be found at 111 Main Street near the Andover Academy. — NATHANIEL T. VERY, *Secretary*, 66 Orne Street, Salem, Mass.

1888

Although your Secretary promised that the April number of *The Review* would contain the last ballyhoo concerning our Forty-Fifth Reunion and celebration at Rockport, June 9 to 11, as the next regular class notes would not be due till the July number, still he has since discovered that it might be possible to "break into" the May issue.

He decided to try this after a very recent check-up on the celebration facilities of Rockport. This was made by President Sawyer and your Secretary in Prexy's trusty Studebaker, which made the trip from Boston inside the two-hour limit without breaking the speed limit. Information of interest was obtained as follows: The clams for our Saturday noon clambake are waiting patiently in the Essex clam flats to be dug on the morning of June 10, and the lobsters for our Saturday night reunion banquet are peacefully crawling on the bottom of the ocean off Cape Ann. Specifications have been accepted for the special clam boiler and coffee pots to be used by Chief Engineer Charlie Faunce, of New Bedford, who will design the clambake furnace. Two ample garages are waiting to receive our cars. The Rockport Country Club, only half a mile from the hotel, is being put in the "pink of condition" for our use, the tennis courts re-surfaced, and the club house will be ready with ample caddie,

1888 Continued

locker, and shower bath facilities. Two motor boats were inspected in connection with the proposed Saturday afternoon, three-hour, 30-mile trip around Cape Ann and through the Annisquam River, as we shall virtually be on an island which will be circumnavigated on this trip. A photographer has promised to take our 8" x 10" group photograph shortly before we sit down to our grand lobster banquet Saturday night.

The "motorcade" of cars will be routed by all the points of interest Friday morning on the way out from Boston to Rockport, including Memorial Drive and the Technology buildings on the Charles River, the historic Mystic River, Revere Beach Parkway, Ocean Drive, the New Ocean House in Swampscott, Marblehead, Salem, and beyond Beverly the world famous North Shore Drive through Prides Crossing, famous Henry C. Frick estate, Beverly Farms, Manchester-by-the-Sea, Magnolia Beach, famous John Hayes Hammond estate, and the old fishing town of Gloucester to the very tip end of Cape Ann where the Straitsmouth Inn, our hotel, is located. There will be bathing and artistic views by the dozen, so bring both your bathing suit and your camera as well as your golf clubs and tennis racquet.

If you find the above does not mention your special sport or hobby, just drop a line to the Secretary and he will provide it or tell you why he cannot. So check your return post card if you have not already done so, and slip it in the post box. You will never regret your decision to drop everything and come to Rockport on June 9 to 11. — BERTRAND R. T. COLLINS, *Secretary*, 25 Bennington Street, Newton, Mass.

1889

On the evening of March 14 a distinguished company (consisting of President Thurber, along with Bridges, Hobbs, Hunt, Kilham, Kunhardt, Laws, Lewis, Orrok, William Lincoln Smith, and Wales) sat down to dinner at the Boston Architectural Club. The change of location was made primarily as a measure of economy, and partly to show the members how architects get along, but the picturesque surroundings and good food served by the steward caused a unanimous resolution to go there again next year. It was also resolved that it would be a fine idea, weather and the depression permitting, to have a reunion at Kunhardt's place at Cataumet next summer. Kunhardt said come on and the rest said okay. A circle was formed about the great fireplace and a stream of wit, wisdom, and romance flowed steadily until it was time to go. All those who were absent should resolve now to come around next year.

The Secretary's office address is now 126 Newbury Street, Boston, where his firm is installed in better and more convenient quarters.

Clayton W. Pike '89 has written a report on "Distribution Cost of Electric Energy," with special reference to the residence and rural customer, for the Power Authority of the State of New

York. This report is a preliminary study of investment in and annual costs of the distribution of electric energy in New York State.

On January 11 Hart was elected President of the United Fruit Company. Beneath a lifelike portrait the Boston *Post* carried the following story: "Francis R. Hart was elected President of the company. Mr. Hart has been thoroughly familiar with the business of the company, not only through his residence for some years in the tropical countries in which the company operates, but as a director and member of the executive committee since 1901 and as chairman of the finance committee. Francis Russell Hart is a New Englander of New Englanders. He was born in New Bedford, was of the Class of '89 at the Massachusetts Institute of Technology; married Helen Bronson Hobbey of Northampton, in 1896, and resides on Beacon Street. Upon leaving college, Mr. Hart went to Jamaica, British West Indies, and was interested for several years in engineering problems connected with the island's agricultural development. He then went to Colombia, South America, as manager of the Cartagena-Magdalena Railway System. On June 4, 1901, Mr. Hart was made a member of the board of directors of the United Fruit Company and in November of the same year was elected a member of the executive committee. He has served the company in that capacity ever since. Mr. Hart's long connection with the Old Colony Trust Company of Boston is also noteworthy. Mr. Hart is the author of the very authoritative books, 'Admirals of the Caribbean,' 'The Disaster of Darien,' 'The Siege of Havana,' and is a member of a dozen learned societies, among them the American Antiquarian Society, American Academy of Arts and Sciences, Massachusetts Historical Society, Colonial Society of Massachusetts, and Odd Volumes Club of Boston. He is a fellow of the American Geographical Society, the Royal Geographic Society, Imperial Institute of London, Pan-American Society, China Society and numbers among his clubs the Somerset, St. Botolph, Exchange, Union, University; Grolier, India House, New York; Wamsutta Club and the Royal Societies Club of London." Another and longer story appeared in *Fortune*.

As President of the National Association of Wool Manufacturers, Hobbs made an interesting address before the recent convention of the National Wool Growers Association at Portland, Ore. The historical facts which he brought out were especially interesting, as well as his views on the present problems of the industry.

Wales has a beautiful colored lithograph of the engagement between the *United States* and the *Macedonian* on view at Goodspeed's, which in the Secretary's opinion is the finest and most spirited thing he has done yet.

On Wednesday, February 15, Orrok discussed the "Effect of the Decreasing Cost of Steam Degenerating Energy on the Future Transmitting System," at a

meeting of the Metropolitan Section of the American Society of Civil Engineers in the Engineers Society Building, New York. — WALTER H. KILHAM, *Secretary*, 126 Newbury Street, Boston, Mass.

1891

The following members of the Class attended the Annual Alumni Dinner at the Hotel Statler on Saturday, February 4: Wilson, Bradley, Dana, Hatch, Young, Bowen, G. A. Holmes, Rogers, Fiske. Linfield Damon expected to attend but was unable to on account of the death of his mother that afternoon.

As soon as we heard of the earthquake on the Pacific Coast we wired to Charlie Garrison and Barney wrote letters to Charlie, George Hooper, and others. We learned from Charlie's brother that he and his family were all safe and there was no serious damage to their home at Long Beach. The following letters have since been received. Charlie writes: "I appreciate your having me in mind in this calamity. Fortunately we are all well and unhurt. At 5.54 P.M. on Friday Mrs. Garrison was sitting on the sofa of the living room and I was at the table coloring some charts for Bob with crayon. Suddenly the house rocked, the bookcase with its contents fell to the floor. I turned and got to the sofa, I don't know how, and we clung to it like two shipwrecked sailors to a spar. At the same time there was the crash of the falling chimney and the breaking of glass and china. The electric and telephone wires on the pole line which I could see through the window danced in great loops. The feeling was indescribable, the sudden oscillating movement with the wave motion added was a new one to me. It seemed a long time and was probably of five or six seconds' duration. We were most concerned for the grandchildren who were having supper in the kitchen below with the maid. We rushed through to their house and down stairs, looked out in the street, and not seeing them climbed the stairs to the third story calling them. As they were not there we went again to the street where we found them. At the shock they were thrown from their chairs amid a shower of glass and crockery. The maid seized them and took them through the back door to the street. Fortunately, they did not go by the side where the chimney was falling.

"We found all the families living on our street gathered together. A doctor with his wife and two children were the first to leave. Another family of three children and nurse were alone, the parents being in Pasadena. A second family of three were expecting their parents. A third family of three children with their mother started off in their car for relations 20 miles away. Five minutes later the father appeared having made his way through the most devastated part of the city. I went to the garage and got out my car, opening the sliding door with difficulty. The concrete floor had buckled in the middle of the garage so the center door could not be moved. Then I got out the Ford car from the first compartment

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of the three-car garage. With some aid we got the door open wide enough for the car to go through. I drove these cars to the front of the house and parked them opposite a vacant lot. Then we had five children and four adults prepared to spend the night in them. I made several trips to my apartment for food and bedding.

"After a while the parents of the first family of three appeared and took the children and maid from our cars and left for Pasadena. The husband remained and we turned over the Ford car to him. Then the parents of the second set of children returned and took them aboard one of the war vessels as he was a naval officer. Our family was the only one left except for the two men who planned to remain. Bob has been suffering from arthritis for some time so he and Catherine had left for Warner's Hot Springs in the afternoon to spend the week-end. It was about 100 miles away. They arrived just about the time of the quake and at 8 P.M. they were notified of the catastrophe. They made record time for home. We knew that they would return as soon as they heard of the quake and we planned to await their return. But—about 9 P.M. a police car with sirens screeching came down the peninsula notifying everybody to vacate as there was a tidal wave coming up the coast! This proved to be unfounded but it caused much fear and trouble. We then left for higher ground while the two men we left with our Ford worked until after midnight removing those who had no car to convey them to places of safety. After waiting a while we decided to go to Pasadena, 30 miles away and seek refuge with Catherine's father. So after an hour and a half with three lines of traffic leaving on one of the many outlets, in darkness and through fog, we arrived at Mr. Cooper's at 11 P.M. Ten minutes later Bob telephoned and learned of our safe arrival. When he came to Romona, about half way home, he telephoned to friends in Santa Ana asking them to go to Long Beach and bring us to them. But when the messenger arrived we had gone! At 1.30 they appeared in Pasadena and thus after a hectic evening for all we were happily reunited there without accident.

"Long Beach is near a 'fault' running northwest to southeast so that the shocks took that direction and all things tended to slide along that line. Waves spread at right angles where the ground was seamed with cracks northeast to southwest. The huge concrete block of the street pavement oscillated, coming to rest with spaces three to six inches between the sections. Land and houses settled three to four inches while the peninsula spread a couple of feet in width. The greatest damage and casualties were due to brick construction. Such buildings disintegrated, showering bricks in all directions. Most of the plate glass was shattered. Many schools are of brick, a number collapsed, and some burned. The death list would have been greater had the pupils been in the buildings.

"The Coopers were glad to take us in, seven in all, but we did not want to stay longer than necessary. The serious condi-

tion is the water supply, since it comes from wells and may become contaminated through breaks in the sewers. So yesterday morning we came to Corona del Mar, 19 miles from Long Beach. This is the summer home of friends and we shall be here for some days, but will make daily trips to Long Beach. We are quite near Dr. Noyes' house (former Chemistry Professor at Tech)."

George Hooper writes: "In Pasadena, while there was considerable suction, the ground appeared to move in long waves instead of vibrating so that buildings suffered little if any damage. My own home, a frame and stucco building, suffered no damage that I can discover beyond perhaps one or two cracks in plastering. I am not sure that these are fresh cracks. A noticeable roaring noise accompanied the quake.

"My wife and daughters, having been in the Santa Barbara quake of 1925, were naturally much alarmed so that we did not go to bed that night. As gas is used practically exclusively for cooking, heating, and hot water supply, we shut off all pilot lights to be on the safe side. The radio reports which came in during the night were most alarming but as it later proved were much exaggerated. The disturbance has followed the usual course, many minor quakes following the first shock. Several of these were heavy enough to be alarming and did some additional damage, but so far as I can learn no further injury to persons or loss of life. There have been no noticeable quakes since early yesterday morning although doubtless the seismographs are not yet quiet. We hope that the disturbance is over.

"As usual the damaged structures were of old and inferior types of construction, brick and hollow tile suffering the most. Reinforced concrete and steel frame, when well designed, stood well, and frame buildings best of all. Numerous parapet walls, copings, and cornices fell in Los Angeles and some of the older buildings were quite badly damaged. The County Court House, which once took an architectural prize as the finest example of Romanesque architecture in the U. S. (Trinity Church, Boston, being second), was so badly wrecked that it has been condemned and is to be demolished. This is a blessing in disguise as this structure was antiquated, with inadequate plumbing and ventilating appliances and no interior fire prevention. The new Hall of Justice, a modern building designed for a certain degree of earthquake resistance, stood up well so far as the frame is concerned but suffered much cracked plaster and cracked and loosened marble wainscoting. Many schoolhouses suffered severely, it being most fortunate that schools were not in session. Had the children been in these buildings great loss of life would have occurred. I anticipate that a new and safer building code will result from this experience with a lower height limit for structures and an absence of projections on the outer walls.

"There were as usual many 'freak' effects such as chimneys broken loose from supports, turned at a large angle

around a vertical axis and left standing. The machinery in the Firestone Tire Plant was practically all moved off the foundations, while the building suffered but slight damage.

"I have just heard from Wilkinson in Los Angeles who says that his house and contents are practically undamaged although a chandelier swung so as to nearly hit the ceiling on both sides. He says that he has been comparably shaken up personally only by an automobile wreck.

"Well, this seems to be a fair general résumé of the situation. It is pleasant to find that the '91 men here were spared injury and damage. What new buildings are put up will probably be safer than those now built so that our future experiences will be limited to having a bad scare when the earth again rocks. Personally, I have taken much comfort from a book on 'Earthquakes' brought out by John R. Freeman '76 just before his death."

As a matter of some interest, the Secretary is informed that serious water damage occurred in some of the large factories due to breaking of water pipes and large sprinkler risers, and in some cases portions of the walls fell. Apparently there was very little insurance covering earthquake damage so that most of the loss will fall on the property owner.

A letter from George Hooper written in December tells of some of his family activities. "Speaking of my son-in-law, it is a curious coincidence that he is related to Mrs. Wilkinson, wife of M. C. Wilkinson, VI. He and I meet occasionally at the dinners of the local Tech Club. All of our young people have recently been away—our son-in-law on a yachting party in Santa Barbara Channel, and his wife with our son and younger daughter went duck shooting with friends at a duck club at Guadalupe, about 325 miles north of here. The moving picture 'Morocco,' which you may have seen, was filmed on the sand dunes adjacent to the Duck Club, which will give you an idea of the nature of the country. The young people secured plenty of ducks and saw a large flight of wild swans. These latter are securely protected here by a long closed season, lasting for some years, with a fine of \$1,000 per bird for possession either alive or dead. A yachting trip in late November will sound strange to Easterners but the weather here was beautiful, light winds and very little fog. All of the young people are to go duck hunting again just before Christmas and our 'Christmas Goose' will probably be Canvas Back or Sprig."

We hear of various winter cruises and trips. Francis Holmes sailed to California via Havana and the Panama Canal. Steve Bowen has been on a West Indies Cruise. George and Mrs. Vaillant started around the world but we haven't heard from them since.

A letter to Barney from Charlie Wood in Albany has some interesting comments on ancient history, together with mention of President Compton's visit to Albany: "Your birthday postal received.

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Indeed I do remember those old days in Hingham. It must have been about 40 years ago when my family lived in that old cottage at the foot of Old Colony Hill, and we went there every summer for years after. The steamboat wharf was right across the street, the first year, but was so badly damaged by the terrible storm in which the *City of Portland* sank, that it was removed and the boat came to Hingham no more. The President of the boat line was Dr. Barnes, our neighbor in the next house, 'King Barnes' as he was called by the natives, and a great friend of father's. The Captain of the steamer would look up the hill when the time came for the morning boat to leave for Boston, and if any members of the 'royal family' were in sight, the boat would be held until they got on board. That first summer was the best one. The boat came to Crew Point for years afterward but that service is discontinued now, and the old wharf turned into a yacht club. My sister, Mrs. George A. Cole, lives in Hingham now on Lincoln Street. Mr. Cole is selectman. I get to Hingham and Boston about once a year, and next time I will look you up. I have been living here in Albany since 1908, as a designing engineer in the Department of Public Works. Senior Civil Engineer is the title. I married an Albany girl, Margaret MacNaughton Thompson, and have three sons, John Hancock, 20 years old, a junior in M. I. T.; Alexander (Sandy) MacNaughton, 17 years old, who will go to Princeton next year if the money holds out, and Charles Hancock, Jr., 13 years old.

"Our Technology Club here has about 70 members. I am President this year. On December 18 we had as our guest and speaker at a dinner at the University Club, President Compton of Technology. What a fine fellow he is! He arrived in the afternoon and I had the pleasure of showing him the Port of Albany, and the new bridge under construction between Albany and Rensselaer, with a vertical lift channel span weighing 2,700 tons, the heaviest in the world. As the counterweight weighs the same, the entire mass to be moved is 5,400 tons. The bridge is so perfectly balanced that it only takes 35 h.p. to operate it under normal conditions, at an average speed of one foot per second.

"To come back to old times, do you remember our freshman year when you were 1st Sergeant and I was 2nd Sergeant? In my mind's eye, I can see just how you looked marching around the old gym at the head of the company. I did not take to the military life and I guess I made a very poor substitute for you on the rare occasions when you were absent. How rattled I used to get when I had to call the roll!

"The only classmate I have seen for years is Frederick Clouston Moore. We went through the Brookline High School together and combined on our thesis in senior year. He comes to Albany occasionally on business."

Philip Powers writes from Springfield, Mass.: "Yes, of course, I remember Clarence Whitney and he is one of the

few people at Tech that I have seen more or less frequently in the past few years. He came to Springfield once in a while and I have seen him more or less up to the last year or so.

"I don't know whether it will be possible for me to get to the class dinner or not. I rather doubt it. I am tied down in more or less of a rut at my factory and when I do get a chance to get away, I usually go with my family up to New Hampshire, where we have a place on Lake Sunapee."

Fred Moore mentions attending an Alumni meeting in Chicago where he listened to Allan Rowe, President of the Alumni Association.

Charlie Aiken had an attack of the grippe at Christmas time but says that he is out now and we hope he will visit us again in Boston in the near future. He plans to go to Webster Lake, N. H., early in May.

The following is a newspaper account of the death of Harry Jordan which occurred on March 14, 1933: "Services for Harry Warren Jordan, member of the Syracuse branch of the Aetna Life Insurance Company and formerly a chemical engineer for the Solvay Process Company, who died Tuesday night, will be conducted at his home, 133 Stolp Avenue, at two o'clock tomorrow afternoon. Burial will be in Morningside cemetery.

"Born in Kennebunk, Maine, April 4, 1869, Mr. Jordan attended M. I. T. Immediately after his graduation in 1891, he became associated with the Semet-Solvay Company as a chemical engineer. He was connected with the company 30 years.

"During that time he was active in the research and early development of many new chemicals and was instrumental in the development of some of the major chemicals used in the manufacture of picric acid and T.N.T., which was used during the War.

"Mr. Jordan was manager of the department of special manufactures of the Semet-Solvay Company, handling these products in the laboratory experimental stage and later in their tonnage production. Among other processes he developed was one for producing a higher quality of alumina, which he turned over to the Aluminum Company of America when the Solvay Company relinquished its aluminum activities and turned its furnaces over to other work.

"He was active in many civic enterprises and aided in establishing Onondaga sanatorium. Mr. Jordan also took an active part in other work pertaining to the prevention of contagious diseases.

"Mr. Jordan was a director many years of the Solvay Bank and for 20 years was a director of the Onondaga Provident Loan Association, which was founded by Frederick R. Hazard. Since July, 1921, he has been associated with the Aetna Insurance Company in charge of annuities. He was a Mason and a member of May Memorial Unitarian Church. — Surviving are his wife, Mrs. Alice T. Jordan, a stepdaughter, Miss Margaret Elizabeth Tuttle, and five nephews."

Charlie Wetherbee writes from Bath, Maine, and says that he was on the trial trip of the large Matson Liner *Lurline* in December and on the U. S. Cruiser *Portland* in January and that both trips were very successful. — HENRY A. FISKE, Secretary, Grinnell Company, 260 West Exchange Street, Providence, R. I. BARNARD CAPEN, Assistant Secretary, The Early Convalescent Home, Cohasset, Mass.

1892

Members of the class who attended the reunion last June will, no doubt, remember the cheerful, brave letter from our classmate, Frederick L. Rhodes, which was afterwards included in the notes from our class in the October, 1932, Review. I have today received word of his death at his home in Short Hills, N. J., on March 18, 1933, and a copy of the notice of his life which appeared in the New York Times, which was forwarded to me through the courtesy of Calvin W. Rice '90. "Frederick Leland Rhodes, international authority on telephony, electrical engineer, author, composer, and civic worker, who for 40 years, until his retirement last year, was in the service of the American Telephone and Telegraph Company and its predecessor, the American Bell Telephone Company, died today of angina pectoris at his home in Birch Lane here after an illness of about two years. His age was 62.

"Although his illness had caused Mr. Rhodes to cease active work in July, 1931, and to retire from the post of outside plant development engineer of the A. T. and T. in March, 1932, it did not become acute until several days ago. Mr. Rhodes, whose office had been at 195 Broadway, New York City, had been working in New York since 1907, in which year he took up his residence here.

"Specializing throughout his career as an engineer engaged in outside telephone plant development, Mr. Rhodes had held his last post since 1919. He was one of the prominent members of the A. T. and T.'s department of development and research which was headed for years by Brigadier General John J. Carty, Vice-President and chief engineer, who died last December. Mr. Rhodes accomplished extremely important work in connection with the standardization of materials, apparatus, and practices in underground and overhead wire systems. This work was reflected in plant improvements of the Bell system throughout the United States.

"Born in Boston, October 25, 1870, Mr. Rhodes was the son of the late John Brewer Rhodes and Annie Williams Leland Rhodes. A member of an old New England family, Mr. Rhodes was descended from three Colonial governors: Thomas Dudley and Simon Bradstreet of Massachusetts, and Thomas Welles of Connecticut.

"Mr. Rhodes, after graduating from the M. I. T. in '92, began his career as an engineer for the American Bell Telephone Company in Boston. In his early years with the company, Mr. Rhodes invented

1892 Continued

several minor appliances which were made use of by it. He gained the confidence of his superiors and in 1912 was one of those who accompanied General Carty to the Pacific Coast on a trip which resulted in 1915 in the completion of the transcontinental telephone line which made possible the first speech transmission between the Atlantic and Pacific Coasts and led to the extension of nationwide telephone service. Mr. Rhodes was one of those who instrumentally aided General Carty in this accomplishment, which pointed the way to successful transcontinental and overseas transmission of speech by radio-telephone.

"With radio and telegraphy, however, Mr. Rhodes was not concerned. He confined himself to telephony, taking part in many of its advances. He traveled extensively throughout the country from 1912 to 1928, supervising on the scene and in his home office the installation of many improvements, a number of which he initiated. He also appeared frequently for the company as an expert witness in rate cases.

"Mr. Rhodes made a close study of the history of telephony, both technical and legal, and of his superior, General Carty. These led to the publication of two volumes by Mr. Rhodes. The first, 'The Beginnings of Telephony,' published in 1929, is regarded as the most complete and authoritative history of the legal controversies which raged about the invention of the telephone which has yet been written. Just before his retirement, Mr. Rhodes completed a biography of General Carty, which was issued privately last year under the title, 'John J. Carty — An Appreciation.'

"Mr. Rhodes was the author of many scientific papers on telephony which appeared in the Bell Telephone *Quarterly* and of articles on telephony in Nelson's *Loose-Leaf Encyclopedia*, the *Encyclopedia Americana*, and the Supplement of the *Encyclopedia Britannica*.

"Mr. Rhodes was an active member of the American Standards Association and the American Association for the Advancement of Science.

"An accomplished pianist and organist, Mr. Rhodes was a composer of religious and secular music for organ, piano, and voice. His interest in composing dated back to his youth. As a student at the M. I. T., he composed the music for one of that college's most famous marches, 'A Toast to Technology.'

"Mr. Rhodes also composed the music of the concert song, 'I Lift My Heart,' sung some years ago by Laura Robertson, the former Metropolitan Opera star, on concert tours. Only that song and the college march were published, but Mr. Rhodes wrote numerous others which were played and sung by his friends. Many of his songs were sung by his daughter, Miss Eleanor Ann Rhodes of Short Hills, an amateur singer.

"Mr. Rhodes took a keen interest in civic affairs in Short Hills. For many years he was a director of the Short Hills Association, a civic group which has much to do with the management of the

community's affairs. In politics he was a Republican, although he never sought office. . . . Besides his daughter, he is survived by his widow, the former Miss Effie Chandler of Wilmington, Del., whom he married in 1895, and by a son, Leland Chandler Rhodes, also of Short Hills. . . . Burial will be in Mount Auburn Cemetery, Cambridge."

Mathews also sent me the above obituary notice and says further: "Things go much as usual with me. Occasionally I see Wells of Dayton and, of course, a good deal of Colonel Waite '90, who is engineer of the new terminal here (Cincinnati). Wells is prosperous and looks happy as though his life had been a successful one. As I have two very nice grandchildren, you may know that I have attained to the happiest state of man, that of being a grandfather."

Arthur W. Dean has been elected President of the Boston Society of Civil Engineers. — Professor Johnston is away on leave of absence from the Institute until next fall. — JOHN W. HALL, *Secretary*, 8 Hillside Street, Boston, Mass.

1893

The Fortieth Anniversary celebration is to be held on Saturday and Sunday, June 3 and 4, at the Essex County Club at Manchester, Mass. At this delightful North Shore club, which will be recalled by those participating in the Thirty-fifth Reunion, members, ladies and "offspring" will this year be in attendance at the reunion festivities.

Arthur Farwell, who, immediately after his graduation from M. I. T. in the electrical engineering course, took up music as his life career, has long been known as one of America's foremost composers. He holds a professorship in the Department of Music at Michigan State College at East Lansing, Mich. During the winter the following notice concerning Farwell and the M. I. T. Little Symphony appeared in the Boston *Transcript*: "The Little Symphony of Massachusetts Institute of Technology, conducted by A. George Hoyen, has begun rehearsing for its presentation in March of the 'Pageant Scene,' of Arthur Farwell, M. I. T. '93, distinguished Western composer and conductor, long resident at Lansing, Mich. This will be the first performance in Boston of the 'Pageant Scene' which was written for a pageant at Meriden, N. H. The concert will be notable as virtually the advent of the Tech Symphony as an organization giving programs of symphonic quality.

"Mr. Farwell, educated as an electrical engineer at Technology, later studied musical composition with Homer Norris, Boston, and Alexandre Guilmant, Paris. He has given much attention to the music of the American Indian and is founder of the Theater of the Stars, Big Bear Lake, Calif."

Charles Frederick Garlich, member of the American Institute of Architects, is a partner in the architectural firm of Corbett, Harrison and MacMurray at 130 West 42nd Street, Bush Building, New York City. This firm has had many

notable commissions, its latest accomplishment being the Radio City group of buildings in New York City.

From the South African *Mining and Engineering Journal* of Johannesburg, South Africa, is taken the following notice of Benjamin Merwin Mitchell who died suddenly of heart attack on October 8, 1932: "News has recently been received of the death at Passaic, New Jersey, U. S. A., of Captain Benjamin Merwin Mitchell, a distinguished engineer, who was assistant general manager of the firm of Fraser and Chalmers, Ltd. Captain Mitchell will doubtless be remembered by many of the older residents of Johannesburg. He arrived here in 1903 and represented Messrs. Fraser and Chalmers (England), the Lubricating Oil Company of New York, and the Robins Conveyor Belt Company and Manhattan Rubber Manufacturing Company. At the outbreak of the Boer war he raised a company of volunteer engineers, and received the rank of Captain. The company became merged in the Railway Pioneer Regiment. Captain Mitchell was graduated from the Massachusetts Institute of Technology in 1893, and was well qualified for the work which he undertook, among other activities being the supervision of the bridge rebuilding operations after their destruction by the Boers. He had many personal contacts with General Kitchener during this time, and occasionally drove the General over the lines which his regiment had repaired. In the United States, also, he later became distinguished in many ways, both in a social as well as in a professional sphere. He was considered to be one of the foremost authorities on conveying installations, and was honored in 1928 with the life membership of the American Society of Mechanical Engineers.

"His constructional work in connection with dams and water works, bridges and docks of considerable size and importance, has earned for him an enviable and exceptional reputation, and only this year he designed the construction methods of what will be, when completed, the world's largest docks in New York City. His 'Conweigh,' a digger and belt-type loader, was lauded by the United States Bureau of Mines in 1925, as the strongest, most powerful, and fastest underground tunnel digger in the world. Captain Mitchell, who had a varied, useful, and outstanding career in this country and in the United States, died suddenly at the comparatively early age of 62 years."

For several years after graduation, Mitchell held the position of mechanical engineer for the Manhattan Rubber Manufacturing Company of Passaic, N. J., and in 1898 made his first trip to South Africa in that company's interest. At the outbreak of the Boer War in 1900 Mitchell joined the British Army in Cape Town and was commissioned Captain of Engineers in 1901. Following his return to this country from South Africa in 1906, he served as consulting engineer to the Manhattan Rubber Manufacturing Company of Passaic and

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as President of the Conveying Weigher Company of New York. Mitchell was a member of the American Society of Mechanical Engineers; American Society of Electrical Engineers; Institution of Mechanical Engineers, London; South African Association, Johannesburg, South Africa; Engineers Club, New York; New Club, Johannesburg, South Africa; Kimberly Club, South Africa; and for a time served as President of the Passaic City Club.

Charles G. Waite, who has spent most of his time the past few years in Europe, principally in Praha, Czechoslovakia, returned to this country about March 1 for a few weeks' stay. He intends to return to Praha during the spring.

The following changes of address have been received: Walter U. Gutmann, 100 Highland Avenue, Auburn, Maine; William E. Roberts, Cleveland Public Schools, 514 Standard Bank Building, Cleveland, Ohio; George K. Dearborn, 4 Newport Road, Cambridge, Mass. — FREDERIC H. FAY, *Secretary*, 44 School Street, Boston, Mass. GEORGE B. GLIDDEN, *Assistant Secretary*, P. O. Box 1604, Boston, Mass.

1895

If the present economic upheaval were of shorter duration, your Secretary would be inclined to make a personal visit to all the members of the class, to learn of their whereabouts and reason for the apparent apathy toward providing a few interesting anecdotes for the readers of '95 class notes.

The banking holiday has interfered materially with such plans, and the only solution for the present is to await the incoming mails.

From the Boston *Herald* of January 30, we have the following death notice: "Private funeral services for William F. Craig, a state chemist and former attorney, state senator and postmaster of Lynn, were held at his home, 4 Orchard Circle, Swampscott, Mass. He died Sunday at the Lynn Hospital. Burial was in Pine Grove Cemetery, Lynn. Among representatives of organizations at the funeral services were: H. Ashley Bowen from the Lynn Bar Association, E. Mark Sullivan from the Boston Bar Association, and post office officials."

William F. Craig has been identified with the class for a number of years without an address. The Alumni Association advised that he passed on January 29, 1933. The passing years claim their toll.

Professor Harold K. Barrows was elected Vice-President of the Boston Society of Civil Engineers, at the 85th annual meeting of the society, held at the Chamber of Commerce, Boston. — LUTHER K. YODER, *Secretary*, Chandler Machine Company, Ayer, Mass. JOHN H. GARDINER, *Assistant Secretary*, Graybar Electric Company, Graybar Building, New York, N. Y.

1896

Another honor has come to the Class of '96 by the promotion of Captain R. E. Bakenhus (CEC) U. S. N. to the rank of

Rear Admiral from November 11, 1932. This was confirmed by the U. S. Senate on February 28, 1933. The event was fully covered by Memoranda No. 69 of January 16 and No. 72 of March 1 of the Bureau of Yards and Docks of the U. S. Navy. These memoranda give Bakenhus's life and naval history in full, including the award of the Navy Cross to him for services during the World War. The board which selected Bakenhus for promotion consisted of Rear Admirals J. V. Chase, George A. Marvell, and F. H. Schofield. The board met on January 3 and submitted its report in ten days, its recommendation being approved by President Hoover on January 13. This gives the Class of '96 three rear admirals, including Bakenhus, Charlie Morris (retired), and Harry Hamlet as Head of the Coast Guard Service. It therefore seems as if any classmate who wishes to have any dealings with the Navy should be able to obtain satisfactory contact through one of the three men.

Henry Jackson had a letter from John Longgren in Los Angeles reporting that he is still trying to work up his enterprise of a small rolling mill in that part of the country, and has hopes of ultimate success when the financial situation loosens up. — Fred Crosby, who is Manager of the Whittier Hotel in Detroit, is another one who wants easing of the financial situation. At the time this is being written the Detroit banks had been closed for five weeks and all the hotel cash, as well as Fred's personal account, had been tied up. However, they were getting by, using various devices, and were sanguine of ultimately coming out satisfactorily.

Irv Merrell has been spending the winter at St. Petersburg, in Florida, following his usual custom since retirement, but it has not been such a good winter with him, due to a siege of illness which finally ended in a case of shingles. At last accounts he was in the care of a doctor and a nurse, and was very fearful that the fishing season would be over before he could get out again, in which case he would count the winter as a total loss. He was looking forward to meeting with the recently formed organization of Tech men at Tampa to include that part of Florida.

Classmates undoubtedly noticed the death of Al Drum on March 17, as it was given wide publicity in the papers. Charlie Lawrence, with his usual thoughtfulness for the Class Secretary, sent on a clipping from the New York *Times*. Al's father was Major John Drum who was killed at San Juan. Al was born December 19, 1875, in San Francisco, and his boyhood days were spent in various army posts at which his father was stationed. After graduation from Technology he was located in Boston for about eight years, and then went to Chicago, where he established the firm of A. L. Drum and Company, consulting and construction engineers, with branch offices in Philadelphia and Minneapolis. He specialized in electrical railways and public utilities, and made surveys and

supervised projects in various parts of the country. He was General Manager of the Union Traction Company of Indiana in 1904 and of the Chicago Milwaukee Railway in 1906. During the World War he was consulting engineer for the United States Shipping Board and the United States Housing Corporation. He went to Detroit in 1925 on a survey for the receivers of the Detroit United Railways, and became head of the Eastern Michigan Railways, which resulted from the reorganization.

He married Jane Hunter and had three children, John (M. I. T. '26, VI), Hunter, and Charlotte Drum Shottwell, New York City. He had been in ill health for nearly a year, and had resigned as co-receiver of the Eastern Michigan system last November. He suffered a fall in his apartment, and was taken to the Charles Godwin Jennings Hospital in Detroit, where he died a few days later. Al was one of the leaders of the class in our undergraduate days and was Class Historian at graduation.

We announced the departure of the Fullers for England on January 4, on a cruise to Europe and South America, including various islands of interest. The following is the first installment of their travelogue, which was written in England at the end of January.

"Our trip across on the *Majestic*, one of the last voyages before she relinquishes her title of the largest ship in the world to the recently launched French liner, was uneventful, aside from the finding of two stowaways, two births at sea, and an attempt at suicide by one of the women passengers.

"While returning ships to the north of the eastward route were slowed down by high seas, we plowed along almost without roll at the rate of over 27 land miles per hour, making the trip in six days.

"With only about 250 passengers on a ship that can carry 4,000, we were anything but crowded. Good talking pictures shown daily helped pass the time. Many passengers had been in Russia or were on the way there, and conversation turned frequently to that country, pictured either as almost heaven or nearly hell, according to individual experiences — and what each had been permitted to see.

"England is cold, not so much from the actual temperature, which has run from 30° to 40° with fog, mist, and snow, but because of the lack of adequate heating facilities. Except in London, few hotels have 'central heat' as steam plants are called here, and even when present 60° is regarded as warm. If it accidentally gets a degree or two hotter, it is proclaimed as 'stuffy' and windows and doors thrown open to admit the icy drafts. If one wants the chill taken off the bedroom, one pays 50¢ to 75¢ extra for an insignificant grate fire, which toasts one's shins but draws cold drafts down one's back.

"Life, in fact, is one constant shiver here in winter. The English say it is healthful and prevents colds, but as everyone has a well-developed cold, I

1896 Continued

have yet to see who the fortunate person is who is made immune. There is also an epidemic of flu, with the papers full of advertisements of quack remedies, to say nothing of so-called preventives which run from beer to mustard, orange juice, beef tea, and even pure water. Needless to say, the latter is seldom resorted to.

"We have had our first experience of a real London fog. The mist takes on a yellowish, then brownish hue, which becomes darker, until the sky even at noon is almost a brownish black. The street lights are turned on, the trams and buses lighted, and the shops illuminated as at night, while traffic is slowed down to a crawl.

"The people are feeling a little brighter on the financial outlook, but there is as yet little real improvement. The papers are full of propaganda against the debt payments, and the United States is commonly represented as a Shylock exacting the 'pound of flesh.' Seldom are any true facts presented on the situation. The passage of the Philippine independence bill over the President's veto received only five lines in the papers this morning.

"Americans, like all other aliens, still have to fill out special cards when registering at the hotels, and, if remaining long, must register with the police and keep them informed of their movements.

"Semi-beggars, musicians, and sidewalk artists abound in London. Even dogs, trained to shake coin-boxes attached to their collars as one passes, are used.

"Theaters and moving picture houses, however, present their usual long lines of those waiting for the last-minute opening of the unreserved seats. It seems almost like a part of the entertainment, books being brought to help pass the time, and stools and even umbrellas hired while waiting.

"We came up to Liverpool yesterday, not quite so trim and neat since the War. England is still beautiful even in mid-winter, with its quaint farmhouses, and still green fields cropped almost to lawn-like smoothness by grazing sheep or cattle.

"This afternoon we set out for the tropics and South America on the big motor-cruiser *Reina del Pacifico*." — CHARLES E. LOCKE, *Secretary*, Room 8-109, M. I. T., Cambridge, Mass. JOHN A. ROCKWELL, *Assistant Secretary*, 24 Garden Street, Cambridge, Mass.

1897

All '97 men will deeply regret to learn of the recent death of their classmate, John E. Carty, I, at his home in Roxbury, Mass., on February 5. Practically all of Mr. Carty's professional life was spent in the service of the City of Boston, his latest position being that of engineer in charge of the bridge and ferry division of the Public Works Department. He leaves a wife, two children, two brothers, and a sister. John was a faithful attendant at all of the social functions of the class, and his genial presence will be greatly missed at our future gatherings. — JOHN A. COLLINS, JR., *Secretary*, 20 Quincy Street,

Lawrence, Mass. CHARLES W. BRADLEY, *Acting Secretary*, 261 Franklin Street, Boston, Mass.

1899

W. E. Parker writes me confidentially from Port Arthur, Texas, that he would be glad indeed to give me news for the column if he had any news but he has been fairly busy with a little job of depth sounding off Georges Banks which occupied him two years and was only finished last October. His fleet is composed of four vessels, and in the last five months of the field season (ending last October) they surveyed 15,000 square miles of water area. Two of the vessels were employed on sounding and the other two remained at anchor as receiving stations for the sound ranging. One phase of the work was particularly interesting. Starting from an astronomical position determined by sextant about 150 miles offshore, they carried sound ranging triangulation to shore control stations and tied in with a discrepancy of only 400 meters.

The above did not sound like news to Parker, being, I suppose, all in the day's work, but it sounded like big news to me and therefore I am passing it on. He is now engaged on a new survey of the western part of the coast of Louisiana. Perhaps we shall get some news out of that later.

D. C. Churchill, The Churchill Weavers, Berea, Ky., has just written me that his firm made 2,700 yards of hand-woven seating material for the new \$3,000,000 Toledo Art Museum. Its 1,500 seats of ample Greek proportions gave them quite a thrill, especially as they won the contract in competition with bidders all over the country.

Norman Rood feels that there is a paucity of news when one stays right at his desk, never does anything conspicuous, and never goes anywhere. But he did go duck hunting down on the Hoga River in Maryland and took home 30 ducks and a wild goose. Norman has extended an invitation for us to attend the 1933 Horse Show which has been organized by his daughter, Deborah. It will be held at Wilmington, Del., June 1, 2, and 3.

H. C. Greer writes that West Virginia is a wonderful state in which to live but he knows of nothing in the way of news that would be of general interest. Ben Hazeltine and Greer are the only '99 men in Wheeling and they meet once or twice a year to swap yarns. They, too, would like to see classmates passing through.

In a grief-laden note Albert Nathan informed me that he had had to work the very year that he thanked his stars there would be no work and he could stay at camp as much as he chose. He hopes business will become normal so he can stay away from the office as he used to do. We all hope that business will soon be normal, even though our reasons differ.

W. A. Kinsman of Newburyport, Mass., and James Dryer of Rochester, N. Y., both wrote soothingly after my

last appeal for news. Kinsman had no news, but inquired about my golf. Doesn't he know that this was the worst golf season in years in and near Washington? Dryer informed me that Billy West runs down to see him occasionally from Toronto and they swap stories. Last year Dryer's youngest son graduated from old Tech — in architecture.

Etheredge Walker sent an envelope postmarked San Francisco. No news. — Lewis Emery is back from Ragusa and other Dalmatian towns and spending the winter in New York. We planned to have dinner one night in February but Lew was ill and the pleasure had to be foregone. Lew was scheduled to give three recitals this winter, one at Town Hall, New York City, one at Exeter, N. H., and the other at Troy, N. Y.

Arthur Hamilton and his wife are spending the winter in New York and it was my very good fortune to have a little visit with them in late February. Ham is interested in the Little Theater movement and having the time of his life.

It is with regret that I report the deaths of Harry G. Johnson, February 26, 1933, Swampscott, Mass.; Russell Gilpin, 941 Berkeley Avenue, Trenton, N. J., March 12, 1932; and Melville R. Davis, November 13, 1932. — W. MALCOLM CORSE, *Secretary*, 810-18th Street, Washington, D. C. ARTHUR H. BROWN, *Assistant Secretary*, 53 State Street, Boston, Mass.

1901

Since last I wrote you I have wandered through the Attic fields of "Upstate" and it was with sadness that I noted how few of the Class are domiciled in these classic abodes. I fail to understand why; it is a mighty pretty part of the country and the Class as a whole evinced strong predilections for the æsthetic as was shown during their student days by their interest in the older portions of Boston. The stately structures on the backside of Beacon hill and the interesting folk ways and customs that had survived in that selected neighborhood had a constant appeal — and they weren't all architects either. I think there was always a true antiquarian spirit, for interest in the Old Howard, the old Hayward, and other venerable shrines was a rather general characteristic. But anyhow, upper New York state seemingly does not offer the same appeal. One notable exception must be made in the person of Ralph Robinson, leal and lengthy as of yore, who collected me in Albany and in company with a former fellow townsman of mine, Sprague, of the Class of '02 and Cape Ann, guided me on the hazardous trip to Schenectady, a town which none of my foreign friends can spell and about which in my less alert moments I, too, experience some qualms. Ralph, after raising the intellectual tone of the Institute for a year or two as a very junior member of the instructing staff, entered the employ of the G. E. and has conferred upon them a like benefit through all of the supervening years. Judging by the way he led me, a gayly chartered libertine, through door after door with "Positively No Admittance"

1901 Continued

blazoned on it, he must now occupy a position of great dignity, responsibility, and, I trust, emolument. As a New Englander, Ralph showed the local reluctance to a commitment, but I believe there is an excellent prospect that he will be with us at the Thirty-Second Reunion. Those of you who attended the Twenty-Fifth will remember tenderly the lovely three-part harmony — at least not less than three keys were involved — which he and Joe Evans rendered as a lullaby to those who early sought the downy couch. By the way, Joe is going to be at the Reunion, too, to say nothing of one Edward Seaver who called upon me a few days ago to reassure me concerning his amiable intentions toward the Reunion. What a time the contiguous mainland is going to have. Arsem is also in Schenectady, I think, but I failed to connect with him during my brief stay.

One very pleasant happening in the last few weeks. Many of you will surely remember Alexander Hay Brand Jeffords, then of Philadelphia, who, a model of suave elegance in a fawn-colored surtout, graced our freshman dinner which started in a lowly downtown hostelry and ended in the newly-opened Dutch Room in the Hotel Touraine. Vermilye, Freddy Boyd, I think Jeffords, and one or two others collected so much of the hotel's flat, round, and other formed silver as souvenirs of this momentous occasion that the hotel had to close down for three days in order that guests might avoid the solecism, to say nothing of inconvenience, of eating their soup with a fork or even reverting to more primitive measures. Where are all of those intriguing little butter dishes, plated, it is true, but lovely in design, which graduated from the sordid service of the hotel to become ash-trays for the elect? There was probably not a single room in the South End and Revere Street districts that lacked at least one of these little souvenirs. Well, to go back to Jeffords. I have just heard from him, after a lapse of 30-odd years, from Cleveland, where he heads Jeffords-Hunter and Associates with offices at 8907 Carnegie Avenue. He writes that Lamot du Pont is the only member of the class whom he has seen in recent years, which leads me to wonder why Lamot has apparently hurled my request for information into the wastebasket without gratifying what has never been idle curiosity but only a sincere desire to reunite the missing with those whose addresses are saturninely designated by the Alumni Association as "Good". Anyhow, I hope Jeffords is coming on to the Reunion. He will see Lamot there and a number of the other of his less reputable associates of the freshman year; I am writing Vermilye today to ask him to bring over for the Reunion one of the butter dishes and, in view of impending legislation, one of the steins which just fitted a top hat after the contents of the stein (not the hat) had been removed and the outside thriftily dried with a damask napkin. Fortunately there is a law of limitations which forbids our being called on to answer today for those pleasing indis-

cretions of our youth but which does not deny us the fond memory of their performance.

I wish if anyone does happen to know a good address of one of the missing members that they would send it on to me. I promise neither to abuse their confidence nor destroy their anonymity.

A selected committee of the Class is to meet early in April and at that time final plans for the Reunion will be made. Speaking in a spirit of prophecy — and knowing that I may share the fate of all prophets — I anticipate that Oyster Harbors will be the place, early June the time, and hopefully a goodly gathering of the loved ones together.

Next week sees me in Washington which rejoices in a number of our Class, and Baltimore, whence Bill Sucro came and to which apparently he has never returned, and to Philadelphia where our freshman Class President, R. B. Clark, Reuben, is or was in residence. I shall hope to have much information to impart in my next letter. This is the somewhat breathless contribution of your vagrant but devoted Secretary. — ALLAN WINTER ROWE, *Secretary*, 4 Newbury Street, Boston, Mass.

1903

Two letters from members of the Class have been received and a promise of news from one other. Bryan, I, writes from Carlisle, Pa., where he is a consulting engineer for several small municipalities and Dickinson College. He has apparently been so busy in the past years that he has lost contact with the rest of the Class. We are glad to dig him out. He speaks of his eldest daughter graduating from Dickinson in 1931, so we assume he has others. Hope he will let us know later.

Parker, XIII, sends a brief summary of his work and travels during the past 30 years. These have extended from Bath Iron Works in Maine to the Federated Malay States in the East Indies, and back to the Bucyrus Erie Company in South Milwaukee, Wis. — by the way of Colorado in 1907-1908, San Francisco and Nome, Alaska, in 1910, Seattle in 1911, then to the Malay States in 1916-1917, and back into San Francisco in 1918. All the time building, operating, and selling various kinds of dredges. Sounds mighty interesting.

Tuell, I, with General Public Service Corporation in New York City, has promised to write more fully of himself later.

A short visit was made at Technology during the past month, where Howard, I, and Swett, II, both professors on the faculty, are passing on the torch of education to our children. A small, unofficial, but very enjoyable meeting of 11 of the Class was held on March 6 to discuss and advise with the secretaries about our Thirtieth Reunion. Haddock, George Greene, Jackson, Stiles, Cavanagh, Denham, Nyhen, Aldrich, and Whitehead attended with the secretaries. All live in the vicinity of Boston, and were interested in the proposed plans, details of

which were mailed to the Class in April. It is hoped a goodly number will answer, and that the 30th anniversary will be properly celebrated.

Whitehead, V, and Joyce, V, attended the annual banquet of the Alumni Association with the secretaries. This, too, was a very enjoyable affair, and it was too bad that more 1903 men did not attend. While we four had no objection to being tabled with 1904 men, we would have rather had a whole table to ourselves.

We are sorry to have to record the death of another member of the Class. Walter S. Craven '03 was struck and killed by an automobile last January near Clearfield, Utah, while on his way to his home in Ogden from Tuscarora, Nev. Following his graduation, Craven worked for the Anaconda Copper Company at Anaconda, Mont., then with the Southern Pacific Railroad in Klamath Falls, Ore., in the engineering department, and later with the Union Pacific at Ogden. He served 18 months in France during the World War as Captain in the 22nd Engineers, being retired with the rank of Major.

Following the War, he worked for the U. S. Government as engineer in the Bureau of Roads, and later served the City of Ogden as City Engineer. About a year ago, he went to work for the Tuscarora Consolidated Company at Tuscarora, Nev., being recently advanced to a more important position with this firm, and about to take up his new position at their mines at Telluride, Colo. He was a Mason, and a member of Lodge, Chapter, Council, Commandery, and Shrine; and an Elk. He was married in 1907, and besides his widow, leaves two sons and a daughter, to all of whom the sympathy of the Class is extended. — FREDERIC A. EUSTIS, *Secretary*, 131 State Street, Boston, Mass. JAMES A. CUSHMAN, *Assistant Secretary*, 89 Broad Street, Boston, Mass.

1905

From James S. Brown, II: "The war ended my holding a position with one of the big 'war babies' making all kinds of parts for munitions. When the principal stockholders decided to liquidate the venture at the close of 1918, I was invited to assist the New York District Claims and Salvage Boards of the Ordnance Department to evaluate facilities entering claims against the Government because of canceled contracts for a short period. As it turned out, the 'short period' ran into about a year and one-half or up to June, 1920, when the board completed its work and closed the New York office.

"As I had gotten interested in valuation of plants and equipment and devoted a lot of study to the subject, the valuation of assisting corporations attendant with the preparation of taxes and tax claims of the Federal Government attracted my attention and in 1920 I started as a free lance in such work with occasionally some tax accounting as well. As time went on this work began to slacken and, to fill in unemployed time, worked for such engineering concerns as did valua-

1905 Continued

tion work of various kinds, having been employed on such jobs as the inventory and valuation of property of The New York Edison Company, Public Service Electric Company of N. J., Buffalo General Electric Company, Davenport Water Company, and Interborough Rapid Transit Company.

"One very interesting job was a study of the 'Cost of Operation of the New York Municipal Ferries' made for the Merchants Association of New York (they are actually the Chamber of Commerce of the city). As a result of this investigation, Grover Whalen resigned as Commissioner of Plants and Structures.

"All of my work had been leading me toward a contact with financial work and in 1929 I joined the Field Staff of Standard Statistics Company, Inc. My duties were the gathering and study of facts and making reports of an economic or financial nature on various industries and industrial companies but because of the prolonged depression in 1930 the company began to reduce personnel and in the summer of 1932 they got around to me. And this brings me right down to date."

The characters in recent Rinso advertisements are almost duplicates of the big-headed little people that Grafton Perkins, V, did for the '05 *Technique*. Only the double triangle signature is missing. See the heading for Relay Teams. The faces, however, seem to have been lifted from the movie actresses who so eagerly offered their testimonials of a certain well-advertised product (see CR). — Andy Fisher's, X, daughter, Anne, is an entrant in the competition to find a "Queen" to dedicate the Century of Progress International Exposition at Chicago. Her charming photograph appeared in the Boston *Herald*. — Leon G. Morrill, V, has changed his address to 100 Sixth Avenue, New York. — Ed Burkhardt's, XIII, son, Roger, is senior editor of the Wesleyan *Argus*. — Captain Clayton M. Simmers, XIII A, is stationed at the Navy Yard, New York.

William P. Field, VI, gives us a fairly complete story of his activities: "After leaving the Institute, I went to New York, then to St. Louis, and later to New Orleans. After five or six years I returned East to Rhode Island where I remained for 20 years. Rhode Island is practically Boston but I had lost touch and somehow it was never established again. Then, too, a small family (one son and one daughter) had arrived to bless my existence and you know how they do absorb attention.

"Electrical Engineering was my original ambition but I soon drifted into sales engineering and then to pure selling, always in the electrical field, however. Upon my return to Rhode Island I made a new start in electrical engineering through a position with one of a group of textile mills located in Rhode Island, New York, and New Jersey and finally became Mechanical Superintendent for the group.

"Since the middle of 1930 I have had no permanent employment but I have had the time of my life. I have been going to school all over again. Reviewed math,

Thermo and Applied Mechanics along with letter writing, and so on. I found that my style of writing is referred to in present-day works on the subject as belonging to the quill pen age. And I thought I was good! Well, some of us have to take it 'on the chin' before we wake up."

At the Frostbite Regatta held on March 4 at Essex, just down the river from Middletown, no '05 yachtsmen could be found. Some say that ocean racers are crazier than frostbiters but the former at least get somewhere while the dinghy sailors just go round and round, and occasionally in. — Eugen Kreigsman, I, was appointed by the Governor of Rhode Island to serve on the committee to work out plans for dealing with the unemployment problems in the state. — Ben Lindsly, III, has a new address, Box 1078, Oklahoma City, Okla. — Charlie Starr, I, had an article in the *American Architect* on "Chicago Architects Develop Ideas to Increase Profits." — Frank Chesterman, VI, has been active in the relief organization of Pittsburgh, among other things being chairman of the *Community Councils*.

News arrived this month of the passing on of two members of the class: Alfred E. Taddell, VI, and Louis C. Winship, VI.

Taddell died on March 12 at his home at 27 Monument Street, West Medford. He started, in 1904, in the Bay State branch of the First National Bank of Boston and remained with the same organization until his death. He was born in Salem, the son of Henry and Susan E. Taddell. He was a member of the John Abbott Lodge of Masons, and the Bankers Association of Boston. He leaves his mother, wife, and three sons.

Winship died of a heart attack on March 2. He was well known in the field of electrical engineering and steam power plants. He had been with the Boston and Maine railroad for the last 25 years and during recent years had been in charge of all electrical work including the power through the Hoosac tunnel. He was chairman of the heavy electrical traction committee of the American Railway Association. He was stationed at the North Billerica shops but made his home in North Adams where he leaves his wife, two daughters, and a son. — ROSWELL DAVIS, *Secretary*, Wes Station, Middletown, Conn. SIDNEY T. STRICKLAND, *Assistant Secretary*, 20 Newbury Street, Boston, Mass.

1907

Classmates, remember Birenda C. Gupta who came from India, who took Course VI, and who in our undergraduate days usually wore a turban when out of doors? He has been quite lost as far as your Secretary is concerned for many years — but see what the Boston *Traveler* of March 3, 1933, had to say: "India has played an important and romantic part in the lives of members of the Colcord family in Lynn, dating back to 1909, when Miss Ethel Colcord, daughter of Mrs. Joseph W. Colcord of Baltimore Street, traveled halfway round the world to become the bride of Birenda Chandra Gupta, a

native of India and member of one of the wealthiest and most prominent families in that country.

"The couple today are announcing the engagement of their daughter, Miss Comola Gupta, to Sajah Chowdhury of Calcutta, and the wedding will take place this month. The bride will be attended by her two sisters, Eunice and Tara Gupta, both of whom have recently been graduated with high honors from the Queen's Hill school in Darjeeling, India.

"Love at first sight was said of the first meeting of Ethel Colcord and Birenda Gupta, which took place at the commencement exercises of M. I. T., where he was graduated. Their friendship grew during the time Gupta was in Lynn inspecting the General Electric Company, but it was not until six years later that Miss Colcord left her home for London, where she was met by Gupta's father.

"From there they sailed to India, where the wedding took place, a honeymoon following aboard a houseboat on the Kashmir River. In 1921, Mr. and Mrs. Gupta and their three small daughters came to Lynn and stayed with Mrs. Colcord for several months. At that time Gupta was a professor at Sibpur College and a British governmental official, one of the few native Indians to hold a government position.

"After living for several years in Jhelum, India, Mr. and Mrs. Gupta moved to Ramna, India, where he is now principal of a government school in the India educational service. Gupta was born in Calcutta, one of eight children. The entire family speak English and have always lived with English people. His father was a member of the Indian council in London for many years."

Tragedy entered the home of Bob Rand and his wife on March 17 when his daughter, who was riding in an automobile with her cousin, was killed as the result of being struck by an express train at a blind railroad crossing in Belmont, Mass. The Secretary wrote a note of sympathy to Bob, in behalf of the Class, to his home address, 7 Prentiss Lane, Belmont.

It was certainly good in looking over the 1933 ballot of officers of the Alumni Association to see the names of Ed Moreland, nominee for Vice-President, and Johnnie Thomas as one of the five nominees for representatives-at-large. Ed always was rather dignified, but as the Secretary remembers John in class, in the mechanical engineering drawing room, on Rogers steps, and on the athletic field, with his mischievous ways and comical antics, it seems a bit hard to visualize him sitting solemnly in a committee meeting where important matters are at stake. However, it's been many years since we have seen John and we know he holds an extremely important position with the American Can Company on the Pacific coast, so probably he is serious and sedate now. At any rate, congratulations to these men! They and the other '07 men who have held offices in the Alumni Association and who have been active in Institute affairs reflect honor

1907 Continued

on our class. We all admire them for their ability and their devotion to Technology. — BRYANT NICHOLS, *Secretary*, 12 Newland Street, Auburndale, Mass. HAROLD S. WONSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1908

REMEMBER THE 25th! Oyster Harbors Club, Oysterville, Mass., June 16-18.

Preliminary reports indicate a large turnout. George Glover, General Chairman of Reunion, reports the following fellows outside of New England as coming: H. S. Osborne, Leo Loeb, Edw. Klobberg, Ted Barnes, H. R. Putnam, H. W. Dun, Jr., G. T. Bridgman, W. C. Taylor, W. E. Barton, G. M. Dexter, J. M. Talbot, W. F. Dolke, L. E. Wemple, P. J. Hale, J. M. Burch, G. J. McTigue, G. C. Lees, J. H. Locke, E. F. Lyford, W. D. Spengler, R. W. Ferris, C. D. Putnam, G. T. Glover, H. E. Allen, Kurt Vonnegut, F. H. McGuigan, G. D. Whittle, H. A. Rapelye, and W. E. Caldwell.

Program—The plan is, for those who care to, to visit Technology on Thursday afternoon, meeting for informal dinner at the University Club at six o'clock and leaving for the Cape and Oyster Harbors Club either Thursday evening or Friday morning, as preferred. Friday and Saturday are set aside for "reunioning," with swimming, sailing, golfing, tennis, or motoring; an old-fashioned clambake, and the Grand Banquet Saturday night. We plan to leave the Cape after breakfast Sunday, June 18. If you have any ideas for making the Reunion more enjoyable, let the Committee hear from you.

More information later. — HAROLD L. CARTER, *Secretary*, 185 Franklin Street, Boston, Mass.

1909

Paul Wiswall, Assistant Secretary of the Class at New York, writes: "Most of the problems that baffle business were settled at our 1909 luncheon, Saturday noon, March 11. When Jim Critchett, Max Weill, and Mollie Scharff get their heads together, as they did, around the end of the luncheon table, there is sure to be something worth listening to. But the Triumvirate was not alone in deep thinking. Also there was Dunc Green, Harold Ballard, George Gray, George Palmer, and your local scribe."

The New York City *Journal of Commerce* a few weeks ago announced the election of F. J. King, Chief Engineer of the Linde Air Products Company, as President of the Compressed Gas Manufacturers' Association. King has been closely identified for many years with the manufacture of oxygen and acetylene, and the development of their application, particularly in the expanding use of the oxy-acetylene welding and cutting process. He has been with the Linde Air Products Company, a unit of Union Carbide and Carbon Corporation, for many years.

The Boston *Transcript* states in an editorial that State Senator Thomas C. Desmond, of New York, is sponsor for a plan to further the construction of side-

walks along the state highways of the country roads by classing it as work relief. — Charles R. Main, *Secretary*, 201 Devonshire Street, Boston, Mass. PAUL M. WISWALL, *Assistant Secretary*, General Foods Corporation, 250 Park Avenue, New York, N. Y. MAURICE R. SCHARFF, *Assistant Secretary*, 1 Wall Street, New York, N. Y.

1910

I was sorry to miss the last issue, being laid up with the well-known flu, but since the combined grist of the last two months is one letter, it would seem that one of the two issues would have to be pretty shy of notes anyway. I wish I knew how to pep you fellows up and make you write more, but I don't know of any way to do it. At any rate, I'm glad to have a good letter from Hal Lockett in Chicago. He writes as follows: "This isn't the month for which you said I was elected, but I just had a note from P. K. Wadsworth in which he mentioned several names that sounded familiar, so it seemed like a good idea to pass it on."

"Wadsworth has gone back to Tilton, Wash., where he has an apple orchard. Apparently everything with the orchard is satisfactory except that he can't sell the apples. He mentioned spending an afternoon with Eddie (Professor to you) Goodspeed, who is in charge of Geology at the University of Washington."

"In his travels during the last year or so he has seen Phil Hart in Portland, Gordon Hawes in Palo Alto, and Van Warren in Los Angeles. Apparently they were all getting along as nicely as could be expected for engineers during these times."

"For myself, there doesn't seem to be anything to say. Our business has kept us all humping for the last couple of years, trying to find someone who was going to build or repair their buildings. Sounds simple, but is getting more and more difficult. However, when Roosevelt gets in all will be well (?). We already have several jobs hanging fire waiting for the go-ahead on beer." — DUDLEY CLAPP, *Secretary*, 40 Water Street, East Cambridge, Mass.

1911

Spring is here, still plenty of snow at Douglas Hill, sap is starting from the trees, everything seems on the make, except a sudden lethargy in letter writing, thus causing a noticeable let-down in the size and interest of our class notes. As you read these notes there is just time for you and you and you to write to Dennie if you DO IT NOW!

When the horrible news of the Southern California earthquakes started through the air we awaited newspapers and feverishly watched the death lists, realizing that a half-dozen classmates were in the zone. On the basis that no news is good news we feel sure that no harm has befallen: Charlie Barker, VI, Henry Frisbie, I, and Art Pillsbury, I, at Los Angeles; Roy Van Alstine, I, at Long Beach; Stacy Bates, II, at Santa Paula; and Porter Hart, VI, at Burbank.

In Riverside Church, Riverside Drive at 122nd Street, New York City, in late February, Dick Ranger, VIII, demonstrated the uses of the electric pipeless organ to the boys of the choral class. These boys had been working with Dick in his Newark laboratory experiments, concentrating on the Ranger 32-foot pedal, the electric chimes, and the electric music instructor. We are also proud to note that Dick is one of the five representatives-at-large elected for a two-year term on the Alumni Council.

Also in late February, the 28th to be exact, Emmons Whitcomb, X, appeared before the Cambridge (Mass.) Industrial Association and presented a motion-picture narrative of a flight across the United States in a 14-passenger transport. Reports from the meeting told of the interesting way in which Whit took his audience behind the scenes and showed minute details connected with the operation of a passenger transport. Whit is fast becoming one of the leading authorities in the East on passenger airship travel.

One notable exception to this month's lack of letters is a fine one from Bill Burleigh, II, now back in his native heath, Natick, Mass., following the enforced "swan song" of Besse and Burleigh, Builder's Supplies, Taunton, Mass. Cap Besse, II, has returned to his former bailiwick, Fairhaven, Mass.

Bill writes: "I have not discovered what psychological impulse has inspired this present literary budding, but the physical cause lies in your postal card bidding me to write and particularly stating with emphasis when it had to be done. Recollection detects a similarity between yourself and the late Arlo Bates."

"My boy has now nearly reached college age and I took him over to the new Institute across the river the other day. Had chats with several of the old professors who are still about. Professor Cowdrey, who was in the drafting-room in our day, said some of the boys whom he knew now had boys back in the Institute. He stated that they looked in some cases more like their fathers than their fathers did. We were exceptionally fortunate in wandering through the forging laboratory, to encounter Professor Emeritus Lambirth working at the anvil making a fancy wrought iron fork for one of his friends just as in days of yore. I was more than delighted at the meeting and the lad was just as thoroughly pleased. It was the outstanding event of the day."

Bill closes by saying: "I have attempted in numerous ways to recoup my fortunes and am now writing insurance in all its branches." Good luck, Bill, and we hope your letter will inspire others to write in, for remember you don't have to make some big discovery or win a prize contest to provide a *raison d'être* for a letter, just a friendly note telling just how things are going for you in this current maelstrom.

Oh, boy, there is a Santa Claus! Just barely in time to get under the wire for this issue comes that promised letter

1911 Continued

from Harry Lord, II, now with the President Suspender Company at their Shirley, Mass., plant. He says:

"Last May I was suffering from that universal complaint, nojobitis, when one day an old friend telephoned me and asked if I wanted to go to Australia. I said 'sure,' 'what for,' and 'when do I start?' Much to my surprise he told me that detailed information could be given by Gordon Glazier, VII, our classmate, who happened to be President of the company in question.

"About two weeks later I started for Australia and was gone nearly eight months. Emmons Whitcomb, X, fixed up the routing for me and he did a good job of it. (He would! O.B.D.) He rather insisted that I fly from Chicago to San Francisco and I am glad he did. The air route is delightful and for one who had not seen the Far West before, it gave a wonderful picture of the beauties of our western country, much better than could possibly have been obtained from a train.

"I sailed from San Francisco June 8 on the Union S.S. *Maunganui*, an old boat, not much on size or style, but the passenger list was pretty slick and we had a dandy trip until we reached the first stop, Papeete on the island of Tahiti. There we lost most of our delightful crowd, including movie people, French ladies, and so on, and the next 14 days were a bit monotonous. Tahiti is well styled 'The Pearl of the South Seas' and I don't wonder that such writers as Rex Beach, Jack London, Beatrice Grimshaw, and George Patullo have found it an inspiration for their best stories. The climate is delightful, mostly sunshine tempered by Pacific breezes, palm trees, beautiful beaches, unspoiled natives, and champagne at a dollar a bottle! The island is French and badly governed, which probably accounts for the romantic native atmosphere, which is lacking in the more civilized islands under British rule. It is true the British islands like Rarotonga are more productive and efficient, but the Tahitians furnish much more atmosphere.

"We stopped for a day at Rarotonga and a little more than that in Wellington, New Zealand. Wellington was a disappointment. I didn't see any whales and they didn't stage any earthquakes, added to which it was cold and rainy. The notoriously rough Tasman Sea between New Zealand and Australia was unusually calm during our voyage across, although the week before had seen a tremendous storm and the next week produced another.

"I arrived in Sydney, New South Wales, July 2 and celebrated Fourth of July by electing myself Chairman of the Board of Directors of a British Company. I remained in Sydney five months and, in general, enjoyed it a lot, despite the fact that a lot of my business was made most difficult by a gang of unscrupulous individuals who had become involved in our Sydney Company. July and August in New South Wales are mid-winter months, but mid-winter there is unlike New England, for the lowest temperature you are apt to get is 40° above

zero and the climate in winter and spring is about the most delightful I have ever encountered. Also, there are many very delightful people in Australia, despite the general impression that they are all either bushmen or ex-convicts. Unfortunately the political situation is very bad. Everything inclines toward government control and the Government at present is practically bankrupt. I feel, however, that this will eventually straighten itself out and in a few years from now I believe Australia will be one of the most delightful living places in the world; that is, Southern Australia, as the northern portions are too hot.

"Along in October I found that I was due to finish my job soon and I wrote Gordon saying I intended to steal a little time and return by a round-about way through the Orient. My new-found friends in Sydney gave me a great send-off on November 23 when I sailed for Hong Kong on the S.S. *Change* of the Australian Oriental Line. This route extends north along the east coast of Australia inside the Great Barrier Reef, touching Brisbane, Townsville, Cannes, and finally Thursday Island. The latter has a more or less romantic atmosphere on account of being a pearl fishing center. The harbor there was filled with pearling luggers and we had a chance to look around a bit and meet one or two owners of pearl fishing fleets, typical Jack London heroes. Leaving Thursday Island, we had plain sailing through an open sea to Manila. Previously we had been inside the Great Barrier Reef as above mentioned and our navigating officers had a busy job of it especially while passing through the Torres Straits, which are notorious for their many wrecks. In fact the Sydney-Hong Kong boats anchor in heavy weather rather than risk the torturous passages in this danger zone.

"We arrived in Manila on December 10. I looked over the old walled Spanish city and suburbs in the morning and in the afternoon and evening attended a party staged by an English friend who had been traveling with us. I don't know of a place in the world where a party can be held more delightfully than in Manila. We had dinner on the terrace at the Polo Club overlooking Manila Bay in the most gorgeous setting I have ever seen for a dinner party. My only regret about Manila is that I got back to the boat two hours before it sailed, thus wasting valuable time. It sailed at 6:00 A.M.

"Hong Kong is an example of British efficiency in ruling Eastern peoples. It is composed of a handful of white men and a million Chinamen, but the white handful keeps the yellow million in order. Hong Kong is a most wonderful shopping center. One must be very careful, or have no money upon leaving. I came very near doing this, nearly wrecking the family bank account buying kimonos, pajamas, and ivory things for about one-tenth of what you pay in Boston. From Hong Kong I took a side trip up to Canton and stayed there overnight on the island of Sharmeen, which is the foreign concession. The trip is said to be perfectly safe, but

we got quite a kick out of the fact that river boats were guarded by soldiers against pirates and that on the foreign concession one sleeps behind barbed wire entanglements with machine guns every 100 feet and French soldiers constantly patrolling the outskirts. We were warned not to go prowling around Canton on our own and although we neglected the warning to a certain extent, we didn't permit ourselves to drift very far without a guide. There is much to see in Canton and I should like to go back there again to stay longer than the two days I spent this time.

"I sailed from Hong Kong on December 21 on the Dollar Liner, *President Lincoln*. I spent a most delightful day in Shanghai looking over the war ruins and the relics left from the Japanese bombardment. I very much regretted not having a longer time there. A day in Kobe, Japan, another in Yokohama, one in Honolulu, and I arrived back in San Francisco January 11. The trip took me 53 days from Sydney to Boston. Having traveled so far from Boston once, I shall probably not be satisfied until I get another opportunity to visit the East. Why people go to Europe when they could just as well go to China is something I cannot understand."

Please turn back and reread the last sentence in the first paragraph. — ORVILLE B. DENISON, *Secretary*, Douglas Hill Inn, Douglas Hill, Maine. JOHN A. HERLIHY, *Assistant Secretary*, 588 Riverside Avenue, Medford, Mass.

1912

Your Assistant Secretary steps forward to say a few kind words for Harold G. Manning, X, of Waterbury, Conn. For one reason, he's going to get married, or perhaps we'd better say he has been married, for the announced date is April 12, and by the time these notes appear it will be all over with Harold. He held out a long time but even the strongest of us seem to succumb at last. But that's not what we started out to talk about. We recently received from Manning the selection of Twenty-Year Reunion Snapshots which he so kindly undertook to collect, collate, and get printed at cost for the benefit of those members of the Class who wanted them. These pictures were a source of great delight to Mrs. McGrath and myself, to look over and identify the "boys and girls" who made up the party at Plymouth last June. We realize that under current conditions a dollar looks big as all outdoors to most of us, yet we believe if the other members of the Class could see these photos, they'd find some way to place their order for a set.

This is not an advertisement to get your dollar for some pictures. There's nothing in it but work for Manning, but your Secretarial Department thinks it is good propaganda for maintaining interest in the Class to have these photographs as widely distributed as possible.

Bob Wiseman, VI, escaped the California earthquake zone by about 24 hours. He was in Los Angeles, Thursday, March 9, but wired Mrs. Wiseman, Saturday

1912 Continued

afternoon, the 11th, that he was safe and sound in San Francisco while the temblor was putting on its act in and around Los Angeles.

Mrs. Calvin P. Eldred, wife of C. P. Eldred, VI, is President of the Dedham Women's Club. Her photograph recently appeared in the Boston Sunday *Herald*, as she is featuring a series of teas at her home this season to promote friendliness among club members. Eldred is Plant Engineer for Hollingsworth and Vose, paper manufacturers, at East Walpole, Mass. — FREDERICK J. SHEPARD, JR., *Secretary*, 125 Walnut Street, Watertown, Mass. DAVID J. McGRATH, *Assistant Secretary*, McGraw-Hill Publishing Company, Inc., 330 West 42nd Street, New York, N. Y.

1913

Phil Terry dropped into our office the other day for a professional and social visit. We had some discussion about a modified reunion this year. We should like to hear what others have to say about such an affair.

Arthur Bellis also dropped in the other day while we were out. He left his card, but no news. Bellis, as you know, is President of the Bellis Heat Treating Company of New Haven. He comes to town occasionally for consultation.

Thinking that he was still in Texas, we bumped into Ken Reed just outside our office. Reed is doing consulting work with an office in Cleveland, but is doing some experimental and design work in Lowell. He has been around here for some little time and expects to stay quite a while longer. Reed, like many of us, has acquired what is now politely called the middle-age spread. — GEORGE P. CAPEN, *Secretary*, 50 Beaumont Street, Canton, Mass. ARTHUR L. TOWNSEND, *Assistant Secretary*, Room 3-435, M.I.T., Cambridge, Mass.

1914

J. W. Horton has joined the research staff of the Institute, undertaking a most interesting type of research. For a number of years there has been a strong belief that medical methods could be improved very materially by the application of electrical measurements. There has, unfortunately, been so much hocus-pocus in this regard that this class of research has been somewhat neglected and has been looked upon by laymen with considerable question. In recent years the electrical cardiograph has shown great possibilities. Work has already been carried on on this subject at the Institute at the suggestion of Dr. Allan Winter Rowe. The General Radio Company, with whom Horton has been associated as chief engineer, has built some equipment for this purpose. The consolidation of the work of these organizations on medical research under the direction of Horton has real possibilities of making a substantial contribution to the subject of bio-physics. Although he will be located at the Institute, Horton will continue on the staff of the General Radio Company as a consulting engineer.

It is also interesting to note that Horton holds more patents than any other member of the class. He has just had his list increased by patent No. 1,901,344 covering a power-level indicator. It is a device for measuring small powers, such as are used in radio receivers or amplifier systems in connection with broadcasting.

Donald Dixon, of Monument Beach, Mass., called on your Secretary recently and told him that the depression had at last hit Cape Cod to the extent that Dixon found it necessary to join that ever increasing group of 14 men in the insurance business. Dixon has been operating a garage at Monument Beach, but with the decline in general business in that section and the inability to collect accounts, he felt it wise to stop losses and has abandoned his project. — HAROLD B. RICHMOND, *Secretary*, 30 Swan Road, Winchester, Mass. GEORGE K. PERLEY, *Assistant Secretary*, 21 Vista Way, Port Washington, N. Y.

1915

Wonderful! Delightful! Now that was a Class Dinner. Just in time to permit payment in cash before the well-known bank holiday, on March 2, there gathered at The University Club, Boston, 32 classmates for a Depression Dinner. This is the largest attendance ever at a class dinner and speaks volumes for the loyal spirit of the chaps present. You won't write in about yourselves, but you will show up in person and in force for a dinner. Around the gay and festive board sat Chet Runels, IV; Johnnie O'Brien, I, II, VI, X; Frank Murphy, VI; Frank Parsons, II; Frank Herlihy, II; Louie Young, II; Weare Howlett, X; Wallie Pike, I; Wayne Bradley, V; Ralph Joslyn, X; Evers Burtner, XIII; Abe Hamburg, XI; Max Woythaler, V; Jesse Livermore, I; Joe Sindler, X; Harold Colby, II; George Moulton, II; Vic Enebuske, I; Archie Morrison, II; Fred Waters, II; Pete Munn, I; Reg Foster, X; Pirate Rooney, I; Shadow Sheils, I; Donald Fowle, IV; Rolly Baldrey, IV; Jack (Marshall) Dalton, I; Frank Foster, I; Loring Hayward, I; Frank Scully, I; Bob Warren, VI; and myself. A splendid showing, the success of which was due to the good work of the key men who contacted the other men.

The attendance record would have been bettered if a number of the men who always attend had not been prevented by illness or unforeseen exigencies. It was a genuine pleasure to welcome back these men we have not seen for many, many years: Murphy, Herlihy, Bradley, Livermore, Enebuske, Munn, Fowle, and Warren. A number of these men have recently returned to Boston so we look forward to the joy of their being with us again. The refreshment committee of Messrs. Rooney, Sindler, and Howlett set the others a fast example, so by the time we sat down to an enjoyable dinner, everyone was cheerful, talkative, and lively. Oscar Hedlund, track coach at the Institute, spoke briefly on the benefit of athletics at Technology and the spirit and determination of his boys in training with the limited facilities and equipment

available for their use. He introduced our guest speaker, Mr. George C. Carens, the well-known sports writer on the Boston *Transcript*, who spoke informally on his experiences in reporting athletic events and opened a good-natured forum discussion on "Is Wrestling a Racket?" "Are Professional Athletics Sincere and Honest?" The questions, answers, and interruptions were hilarious. Having a guest speaker was an innovation to arouse new interest and I should say it produced the desired results. Everyone felt grand. An hour's singing around the piano was another new feature, but personally, I prefer good music.

Owing to the stringent financial conditions and the color of the dice, the crap game folded for lack of customers. Then the Rooney Rough Necks, composed of Rooney, Sheils, Runels, Parsons, Bradley, Colby, and Frank Foster, bowled the Sindler Silk Hats, recruited from these erudite gentlemen, Sindler, Scully, Waters, Munn, Moulton, Reg Foster, and Mack. The Silk Hats easily won the first string by one pin and virtue was well on its way toward reward in the second string when the Roughs, by strenuous mental effort, had the Silk's score added in advance and easily arranged their score to finish the winner. And so ended a delightful evening. A jolly bunch of old classmates, enjoying one another, reveling in the fine old spirit of 1915. — AZEL W. MACK, *Secretary*, 379 Marlboro Street, Boston, Mass.

1916

Your Secretary when in New York recently had a very pleasant luncheon with Bill Farthing, Jimmy Evans, Tom Holden, and Jack Burbank. Bill's chief joy in life is badminton and he challenges all comers to New York. His chief worry at present is appraising various properties around the city, which seems to be exceedingly difficult as some of them have no apparent present worth. Jimmy Evans is still with the Johns Manville Company as he has been for the past 14 years. Jimmy has recently specialized on the sale of pipe coverings. His travels take him principally in the central Atlantic states but he occasionally gets as far west as Chicago.

Jack Burbank has left the construction game and his present title is general assistant to the Assistant General Manager in the maintenance division of R. H. Macy's. He likes his new work very much indeed but hopes that he may get back to construction work some day.

Tom Holden is Vice-President of the F. W. Dodge Corporation. Tom confesses a trip abroad last year so apparently business is not so tough. During conversation with the above, the following notes were reported.

George Reperti is now Vice-President of the Holley Sugar Company, Colorado Springs, Colo. He gets to New York occasionally and generally looks up Bill Farthing and Jimmy Evans. Dick Ahern is in charge of the New York Office of the Western Waterproofing Company. They are located in the Grand Central Building.

1916 Continued

Bill Shakespeare is still with the Research and Development Division of the Anaconda Copper Company and has recently perfected the manufacture of copper foil. This new product possesses unlimited possibilities. One of the principal uses is for automobile tops. Steve Brophy is getting along splendidly in his connection with Kenyon-Echart, advertising people. He has been fortunate in bringing in several worth while new accounts for them, the principal one being the Spud Cigarette Company. Lawrence Delabarre is still with the Gorham Company. He has, however, recently moved from Bridgeport, Conn., to Bronxville, N. Y.

It was a great pleasure to receive a letter from Irving McDaniels himself as follows: "Just an annual note to let you know I am still alive and in case you need any dues where you can at least write to me and try to get it. I have been here at the Brooklyn Navy Yard for over a year. We are living at Spuyten Duyvil and enjoy our duty very much. Naval activities are as dead as your golf ball business I guess. You can see from the clippings what we do with our spare time. In the recent American Bridge Olympic, in which 20,000 players played the same duplicate boards, Lieutenant Commander and Mrs. Irving B. McDaniel won the New York State Championship. They came very close to being the National Champions, missing this honor by the narrowest of margins.

"Bud Kaula and his wife went through the city on their way to the Hague. He has just had a nice promotion and is in charge of the Texaco-Holland business. Bud and his wife are two of the finest and I know he is going to keep going right on up. They have two wonderful boys.

"I am still mixed up with amateur theatricals, and enjoyed directing an oriental drama entitled the 'Yellow Triangle,' which was presented here in Spuyten Duyvil. If there are any of the boys who think they are good bridge players and are willing to play for depression stakes, tell them to give me a ring when they are in town." — HENRY B. SHEPARD, *Secretary*, 269 Highland Street, West Newton, Mass. CHARLES W. LOOMIS, *Assistant Secretary*, Bemis Bro. Bag Company, Memphis, Tenn.

1917

Well up in the headlines in recent weeks has been the name of Lewis W. Douglas, new Director of the Budget. Careful research shows that he also has the honor of graduating from the Institute with the Class of 1917. That he is not better known by many of his classmates is due in part to the fact that he spent but one year with us after having obtained an A.B. degree elsewhere.

Enos Curtin, formerly a partner of D. M. Collins and Company, is now associated with Boettcher-Newton and Company of New York, Philadelphia, Chicago, Denver, and Colorado Springs, members of the New York Stock Exchange.

Citizens of New Hampshire are rejoicing in the birth of another great shoeman, Master Robert C. Erb, Jr., son of

the well-known Treasurer of J. F. McElwain Company of Nashua. The mother and son are reported as doing nicely and the father as recovering.

I tried to reach Atwood P. Dunham, Jr., at Walter Baker and Company last month to run down a rumor that he had gone into business. The rumor was confirmed and he was finally located at Moffat, Inc., with offices in South Boston, a new organization in which Brick is interested and about which the Boston *Herald* of March 7 had the following to say: "The establishment of a new business requiring considerable outlay of capital, in times like these, which are at least depressed, indicates a confidence in the business future of our country. Alexander Moffat, President of Moffat, Incorporated, a cooking chocolate factory which was incorporated in August, 1932, and began production January, 1933, admits that confidence, even voices it very warmly." — RAYMOND STEVENS, *Secretary*, 30 Charles River Road, Cambridge, Mass.

1918

While plans for our Fifteenth Reunion fluctuate from Bronx Park to the Thames River, and nobody knows much where it will be held, your scribe has taken advantage of a survey now being made by the Humanities Department of all the Technology men listed in "Who's Who in Engineering" and "Who's Who in America." There are 937 names in the former, 509 in the latter, and 172 duplications. The "Who's Who in America" contingent has its center of population about the Class of '95. Tied for high place are '89 and '96, with 26 names apiece. "Who's Who in Engineering" is a younger man's book. The Class of '05 takes first place with 45 names and the center of gravity of the curve is about 1907.

Secretaries of other classes are hereby invited to send a stamped, self-addressed envelope if they wish lists of their famous mates. Let us examine the 1918 roster of immortals.

First comes Sidney Briggs Blaisdell, II, once of Providence, but now manager of the Braiding Machine Department, Fidelity Machine Company, of Philadelphia. After a post graduate course at the Naval Academy, Blaisdell married Eleanor M. Platt of Los Angeles, had three daughters, and worked up a reputation by inventing all sorts of gadgets for braiding machinery.

This next one you'd never guess. It's Stuart Hill Caldwell, II. Wonder if that von Hindenberg pompadour and the Fuller Brush moustache have helped his progress with the Detroit end of Bijur Lubricating Corporation's business? Anyway Hazel A. Coss of Newton Center loved 'em enough to marry 'em. On the way up, Stuart worked for Tommy Edison almost a year; had a sales job in Chicago; convinced the A. O. Smith Corporation that he was an automobile frame expert. During the present hibernation of business in Detroit, S. H. C. will be found at the Ingleside Club.

Stanley Robinson Cummings, II, will always be associated in my mind with his remark freshman year, "Gad, isn't it

funny how a curve can be asymptotic!" Stan got a master's degree in 1920; married Gretchen C. Horst of Wollaston, Mass.; tried teaching engineering at Oregon State College; got a better opening at Lafayette; but was lured away from teaching by a chance to run the research laboratory of the Hoover Vacuum Cleaner people. He's still searching for what he lost on the stock market and for royalties on his book "Alignment Charts for the Engineer."

Born in Russia, Yale Evelev, VI, migrated to the land of opportunity and made good. The former Deenie Gordon of Washington, D. C., has presented him with one daughter and two sons in whose interests Yale sits behind the door marked "President," Keystone Engineering Company, Reading, Pa.

Albert Haertlein, I, came to us with a degree from Mr. Lowell's school up river, and to that institute he returned after some enviable years of practical experience, varying from the U. S. Army to Pittsburgh. Now Associate Professor of Civil Engineering, he is a member of all sorts of erudite organizations; says "yes, dear" to her who once was Ethel Eleanor Lacey of Cambridge; and roars, "Will you be quiet and let me study," when those two boys exhaust his patience.

Like Haertlein, Craig Potter Hazelet, I, came armed with a degree from the University of Washington. Our Faculty thought one B.S. was enough, so Hazelet decided he was no bachelor and got Frances Gillam to help him prove it. Suzanne and Sally now give the home an added touch of femininity, while Hazelet plays golf when he gets fed up on the problems that bedevil the chief engineer and general manager of the Scherzer Rolling Lift Bridge Company at Winnetka, Ill.

Back to mechanical engineers again. After a pretty leap from "H" to "M," we pounce on handsome John Woods McCausland, who is still on the Junior League "eligible list," although no longer a dashing naval aviator. At 20 North Wacker Drive he plays with power factors for the Chicago office of Griscom-Russell Company.

Here's another dark horse: George Edward McLaughlin, II. Remember him in the Tech Show? Mac hasn't added yet, to say nothing of multiplying, but when he does, the product ought to be well disciplined because George has several patents taken out for the Turner Tanning Machinery Company of Peabody, Mass.

The Tech news staff, Tech Show Orchestra (yes, we played the flute beside him), and Mandolin Club helped to groom Edwin Mongan McNally, II, for his job with the Barbasol Company, Indianapolis, Ind. We hope that Dorothea L. Campbell, the Mrs., makes him use his own shaving soap! Remembering Ed's penchant for differential equations, we also hope he keeps the assistant general manager's office well placarded with production charts. Incidentally, if you missed that one at the top of the paragraph about the musical grooming for the shaving soap job, just reflect that anybody can sing in the bathroom.

1918 Continued

Albert Russell Mumford, XIV, showed steam on our freshman class relay team when we took Field Day away from 1917. But Professor Berry told him that, when expanded through a nozzle, steam can travel almost 40 miles a minute, so Al got himself a job as engineer with the New York Steam Corporation. Besides telling a doting nephew (who has been in my classes) things about me that are not so, Uncle Mumford married Cora M. Holm. Edith, Anita, and Dorothy make it unnecessary for him to see the "Mikado" to hear about the "three little maids from school."

The end of the "M's" is not yet. There is still Albert Francis Murray, VI, one-time instructor in radio telegraphy for the U. S. Signal Corps. After working a while for the Hammond Radio Research Laboratory, Jenkins Television Corporation, and so on, he is now Division Engineer, Research, R.C.A. Victor Company, Camden. Attractive Philadelphia young ladies with a technique for engineering things, please note.

After doing research for the National Advisory Committee on Aeronautics, Babcock and Wilcox, and a text called "The Flow of Steel at High Temperatures," Frederick Harwood Norton, VIII, came back to M. I. T. as Assistant Professor of Ceramics (you know, making pottery). Besides doing some remarkable modeling in clay, Ann Harris Norton presides over their home where junior has two sisters to contend with.

The electrical engineers have another representative in John Acton Parker who started at Tufts but decided he liked us better. After leaving the Army, he leaned over a drafting table for the Niagara, Lockport and Ontario Power Company, of which he is now superintendent. Visit him at Jamestown, N. Y., where he lives with the former Gladys E. March of Somerville, Mass., and junior.

One of the few men most of us would have agreed on for this list, had we been prophesying in 1918, is Frederick Brue-ton Philbrick, VI. For a while he taught in the Dynamo Lab. with his chum, Carlton Tucker (see below). He married Frances D. Philbrick, of Somerville, Mass., and is now in the San Francisco office as District Sales Manager for the Gamewell Fire Alarm Company. Don't forget to thank him for his three patents when you dash up to the little red box at the head of your street.

Richard Rimback, I, was one of the three men in our class who understood Professor Vogel when he said, "*Sind da fragen?*" As a result, he has the longest write-up on this list. At the moment he is managing editor of *Instruments*, editor of *Metals and Alloys*, and lecturer in metallurgy at the Carnegie Institute of Technology in Pittsburgh. This trilogy has been achieved via paths as divergent as research engineer for the Union Smith and Signal Company, and translating "Metallurgy Simplified for Practical Use in the Shop." Dick married Martha Dolores Berg of Pittsburgh and says, "*Was der Vater spricht*," to Richard, Jr., and Martha, Jr.

In spite of their multitudinous achievements, neither Ken Reid, nor Ernest Grunsfeld, nor Bill Wills are listed. But lest Course IV go unsung, Marvin Mayfield Stetler, who was with us 1914-1917, is listed as structural engineer and sales manager, Mosher Steel and Machinery Company, Dallas, Texas. Rose Louise Hill has now looked across the breakfast table at him for eight years.

A civil engineer, Clarence Sidney Timanus (the title of his thesis was four lines long!) went back to his native Kansas City to become a member of the Burns and McDonnell Engineering Company. Some years ago Lella Glayd Saunders, also of Kansas City, said "Perhaps," meaning "Yes," so now they are considering the educational problems of Marjorie. Sidney is the oldest member of our Hall of Fame.

Carlton Everett Tucker, VI, baby member of these immortals, has never left the Institute, but besides running the Dynamo Laboratory and tinkering with a signal system for the Boston Police Department, he has been Chairman of the School of his home town, Whitman, co-authored, "Electrical Engineering Laboratory Experiments," married Louise Porter—also a Whitmanite—and taught his daughter to vote Republican.

Back again to mechanical engineers, we find a man who had a lot to do with preparedness back in the days when we had 31-inch waistslines? Arthur Elmer Windle. He was a lieutenant in the U. S. Army Air Service; married Lila J. MacGowan of Brockton shortly after becoming a meter engineer for the Bay State Street Railway Company; and is now Assistant Superintendent of Power and Maintenance for the Atmospheric Nitrogen Corporation of Hopewell, Va. Keep your eye on Muscle Shoals, Arthur.

That's the list of the 18 1918 men in "Who's Who in Engineering." Count 'em. "Who's Who in America" has 509 Technology names, but only one is a sure enough '18 man. — F. ALEXANDER MAGOUN, Secretary, Room 4-136, M. I. T., Cambridge, Mass. GRETCHEN PALMER, Assistant Secretary, The Thomas School, The Wilson Road, Rowayton, Conn.

1920

At a recent meeting of the Faculty Club, Ed Burdell was the speaker on the subject of unemployment insurance. Burdell is now associated with the Department of Sociology at Ohio State University. He served recently as a member of the Ohio Commission on Unemployment Insurance. — Bill Rust is with Laird and Company, located in the du Pont Building, Wilmington, Del. — Johnnie Nalle has just moved back to Winchester and is at the Institute doing some personnel work.

Joe Mahan has gone to Fort Worth, Texas, where he is with the National Supply Company. Carl Leander is back in Boston from the Middle West. His present address is 335 South Huntington Avenue. Bob Burchell is with the Boaler, Burchell and Dillon Company, 63 East Division Street, Chicago. Freddie Britton

is living at 8 Bedford Street, Lexington. He is connected with the local newspaper in that town. William Moy-Ding resides at 19 Harrison Avenue, Boston, and is a member of the firm of H. H. Long Company. He is married and has two sons. — HAROLD BUGBEE, Secretary, 7 Dartmouth Street, Winchester, Mass.

1921

Ray sends us the following news: "From Sol Silverstein we learn that Dr. Oscar F. Neitzke is Technical Director for Bennett, Inc., 143 Sidney Street, Cambridge. Oscar is married and has a family. — Dr. George Thomson is at the Institute, engaged in fundamental research work in organic chemistry and is also doing some teaching.

"One of our recent visitors was Dick Spitz. He is Sales Manager for the General Naval Stores Company, 230 Park Avenue, New York City, and rosin is what he has to sell. Dick has two youngsters, eight years and three years old, respectively. From him we learned that Miles Zoller is still with the Eagle Picher Lead Company but has moved from Chicago to Cincinnati.

"Herm Schmidt is back in New York City, merchandising for Sears, Roebuck and Company. He is married and has a family of three children. Asher Z. Cohen is a chemist with the C. A. Woolsey Paint Company of Jersey City, N. J. He is married and has two youngsters."

Harold F. Stose braved a Jersey snow storm to drop in on us and we enjoyed an all-too-short afternoon of reminiscences. Stiessen reports that Max Burckett is now with the J. Walter Thompson Company, 420 Lexington Avenue, New York City.

On behalf of the Class, we extend our sympathy to E. W. Olcott on the death of his mother. We have just learned of the passing of Mrs. Eric Hodgins, wife of the prominent member of the Class of 1922. She was Miss Catherine Carlson, daughter of Harry J. Carlson '92, the well-known architect. We know the members of the Class join us in expressions of condolence to Eric.

R. W. Smith, Assistant State Geologist of the State of Georgia, has published a paper entitled "Cyanite in Georgia — A Museum Mineral Becomes Commercial" in the December, 1932, issue of *Forestry-Geological Review* which is published by Georgia's Department of Forestry and Geological Development. In connection with the deposits of cyanite found in Georgia, Dick's paper discusses the romance of research and applied science that lies behind the recent ceramic uses of the sillimanite group of chemically similar but physically different aluminum silicates which have found wide use in spark plug and fire brick manufacture.

From the Brooklyn, N. Y., *Eagle* of January 27, 1933: "Announcement is made of the engagement of Miss Ursula O'Sullivan, daughter of Mrs. John J. O'Sullivan of Manhattan Beach and the late Dr. O'Sullivan, to Joseph C. Moosebrugger of Dayton, Ohio. Miss O'Sullivan attended All Saints Academy and the

1921 Continued

Academy of the Blessed Sacrament and was graduated from the College of Mt. St. Vincent on the Hudson. In addition to receiving a degree from Technology, Mr. Moosebrugger is a graduate of the University of Dayton."

Where is that news you were going to send? — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Company, South Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, University Avenue, Chatham, New Jersey.

1922

At lunch yesterday with Heinie and with Harry Rockefeller we had quite a chat about the numerous reasons which made it wise not to try to have a get-together of the men who were at the Reunion last year. We had spoken, as many of you know, of getting a letter out to the men who were at the Reunion, thinking that possibly we could plan for a Saturday and Sunday together late this spring.

Harry Rockefeller has a new responsibility, a small daughter, Phyllis, born in February and thriving according to the report yesterday. — Al Browning was in New York last week-end and said that the good people of Detroit would soon emerge from their financial difficulties, and reported that Chuck Brokaw was making strides in General Motors. — Bill Cooper writes to tell us of the birth of a small daughter, Margaret Morgan, born last August during the eclipse of the sun. Bill is working with the New York State Division of Highways, making his headquarters at Babylon, N. Y.

Paul Ryan is manager of the sales promotion and advertising department of Shell Petroleum Corporation at St. Louis. Paul's function with Shell has been the development of a department to find a market for products which normally were wasted in its manufacturing operation, and to devise products to fit certain needs in various industries other than the normal uses of petroleum products as fuel and lubricants.

Many of you will find the article in *Printers' Ink*, March 9 issue, by George Porter, very interesting. It is a study of adding side lines or increasing territories as remedies for a widespread problem.

Word received recently from West Newton announces the engagement of Miss Elizabeth Warrington Hartel to Dannie Coogan. No date is given for the wedding. — From time to time in Rochester I see Creepy Crofton and Mat Taylor, also Gus Oddlielson, and from them have learned that Hugh Shirey is very active in his work heading up Travelers' Relief there. — Clayte Grover reports a standing invitation to have a Reunion on the north banks of the Niagara River for any of the visiting firemen coming to the Buffalo area.

Those members of the class who have not heard will be shocked to learn of Mrs. Eric Hodgins' death on January 20. In behalf of the entire class the Secretary expresses the dismay that we all feel and extends to Eric our fullest sympathy. Mrs. Hodgins, who was Catherine Carlson before her marriage, was closely con-

nected with Technology in many ways. She was the daughter of Harry J. Carlson '92, the Institute's architect, and for four years she was a member of the staff of *The Technology Review*, becoming an associate editor before her resignation.

With the excellent measures that are being undertaken at Washington, we sincerely hope that all production and sales curves in which you are interested individually will have only one direction to go. Heinie joins me in sending you all our good wishes. — RAYMOND C. RUNDLETT, *Secretary*, The Curtis Publishing Company, Lincoln Building, 42nd Street, New York, N. Y.

1923

As these notes will get into print about May 1 you will all know by then that the Reunion is scheduled for the week-end of June 17 at Saybrook, Conn. The committee, under Lem Tremaine, Bob Shaw, and the other boys in New York, is working out the details for a bang-up party. The rest is up to you.

First, I hope you've sent in your \$2.00 dues requested in the bill sent out in February. If you haven't, it isn't too late. Two dollars in ten years is only 20¢ a year and certainly reasonable, as Pete Pratt remarked in sending his in. Second, your answer to the committee as to your own attendance plans is now due. Get it in promptly.

Even at the early date these notes are written, it is certain there will be a gang on hand. The distances they are coming from promises that! Red Adams, en route to Winnipeg, Canada, writes he'll be here in June. Norman Weiss from Santa Barbara, State of Chihuahua, Mexico, says he'll be there, "with the wife and children (2)". (He hadn't heard it's to be a stag affair, but that's not likely to keep him away.) Harry Pearson writes from Farnham, Quebec, that he'll be on hand. And Pete Pennypacker says there are other replies coming in daily. The depression may be still on in some quarters, but no correspondent so far has mentioned it as a reason for not coming! The low prices are going to offset most of the difficulties from that angle.

That's all the space I'm going to take up with the Reunion this issue as particulars will have been mailed to all members and anything I might say now as to program details might be in error by the time these notes appear. But be at Saybrook the week-end of the 17th.

The Boston *Herald* of February 21 carried the announcement by Mr. and Mrs. Samuel A. Crosby of Melrose, of the engagement of their daughter, Bernice, to Bill Blandy, II. Plans of the couple are for an early spring wedding.

Those of you who read Harold Crowley's story in the February Review on his flying adventures in Labrador will be interested to learn that a feature story in the Sunday *Herald* of March 19 carried his prediction of a gold rush to inland Labrador this summer.

A few address changes which appear to have some significance should be recorded: Bill Wingert, X, from Ashland, Ky., to

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New York City; Scott V. Taylor, II, from Akron, Ohio, to Cascade, Mont.; and Jacob Elfenbein (Aero) from St. Paul, Minn., to Santa Monica, Calif. — HORATIO L. BOND, *Secretary*, 195 Elm St., Braintree, Mass. JAMES A. PENNYPACKER, *Assistant Secretary*, Room 661, Eleven Broadway, New York, N. Y.

1924

Anatole R. Gruehr sent in the following notes: Disregarding unfavorable circumstances, we decided to hold the Annual Dinner Dance for the Classes 1923, 1924, and 1925 on February 4, 1933.

The first thought was to have the party on a rather modest scale, with correspondingly low cost. As the idea spread, however, it became evident that a rather large attendance could be expected and we finally ran the affair at the Fraternities' Clubs Building (which houses the M. I. T. Club), with a five-piece orchestra and other important items contributing to general contentment.

There were 31 couples and three stags. From the Class of 1924 there were: George Arapakis, Roland Black, Bill Coleman, Dick Lassiter, Perry Maynard, Lou Porter, Greg Shea, Henry Shore, Bill Sturdy, and myself. — The Class of 1923 was represented by: Ted Carpenter, Rod Goetchius, Bob Henderson, Dave Kaufman, James Marangos, Charlie Mapes, Steve Miller, Michael Patistéas, Al Pyle, Bob Shaw, Ed Thimme, George Tzougros. — The Class of 1925 was represented by: Leon Benos, Sam Samuelson, and Max Levine. There were also several guests.

The party lasted until one o'clock. After that time it split up into several groups, one of which, consisting of some 14 people, landed in my apartment on West 10th Street, where they refused any refreshments other than strong black coffee and crackers and cheese. It broke up sometime Sunday morning.

As I understand, everyone I have heard from so far has carried away very pleasant, though somewhat hazy, and therefore very much varied, remembrances of the occasion and of all the happenings. On the whole, I believe that this was one of the best, if not the best, of the four annual parties we have had so far. We have even made some money on it which will be kept in some very safe bank to start off the fifth party next year.

The class has a new baby in the person of Robert Bennett Simonton, introduced to society on February 22, 1933.

Our full sympathy is extended to Bill and Eva Correale in their sudden bereavement. Their daughter, Ruth Elizabeth, five years old, passed away on March 26, 1933, after being ill only a few days with a throat infection. She is survived by a brother, William Herbert, Jr., age three. — HAROLD G. DONOVAN, *General Secretary*, 372 West Preston Street, Hartford, Conn.

1925

First comes a sheaf from our President, Frank Preston, who lives now at Stonington, Conn.: In order to increase the quantity of '25 news in *The Review*, I have

1925, Continued

appointed Hollis F. Ware, 16 Smith Avenue, Reading, Mass., as Assistant Secretary. He will assist Henry Cunningham in the gathering of news, and I trust will soon have these columns as full of '25 news as they were in the good old days.

Roger Parkinson has just reported the arrival of a daughter, born March 1, weight seven pounds, six ounces. He says, "Sonny is doing fine now; walking everywhere; hasn't talked any yet, however. We are very much pleased at having a girl, a nice combination, as it were.

"Last summer, on our vacation, after leaving your place, we went to Quincy, Mass., for two weeks. On one of our trips we stopped in at Plymouth, and saw Chuck Knight. As we drove by the plant I thought of him, and decided to see if he were still there. He was; looking as fine and fit (or did you write fat, Roger?) as ever. At least he had gained a lot since I had seen him."

At the time Roger wrote this, the banks were all closed, and he was beginning to wonder if they would open before he spent all his money for subway fare. The closing of the banks didn't bother me much, as there's not much money around here anyway so we were able to make a little of it go a long way.

Nelson Malone contributed the following bits of news. He does not say anything about himself, but he is still with the Boston Manufacturers Mutual Fire Insurance Company at 185 Franklin Street. "Toni Lauria has concluded a term of several years service in Brazil, and is now located in Bowling Green, Ky., still working for Goodyear. I met Wilder Perkins in Passaic and was glad to find that he is making good progress and in charge of several departments at the Raybestos-Manhattan Company. He lives at Clifton, N. J., is married, and there are four in the family. Had a good talk with Bob Ashworth recently. He manages to keep busy in the textile line, and was at that time planning a trip to the South, where he has several branches. He is active in Technology Club work in Fall River and is, I believe, the club member in the Alumni Council.

"Chippendale, who at various times has been reported from various places on this continent, is now with Pan-American Oil Company on the island of Aruba, Dutch West Indies. I tried to look him up not long ago, when I was at Curaçao, a few miles distant, but there are no easy means of communication. Ed Cousins continues his work with the Factory Mutual Laboratories, where he has been since 1925. Fred Jourdan dropped in to see me at the office one day, and reported that he was temporarily a soldier in the ranks of the unemployed, but he had hopes. Previously he had been working for the Submarine Signal Company. Occasionally I meet Howard Smith around Boston, as genial as ever. He continues with McDonald Brothers, Engineers. Haven't seen Witham for several months, but when I last saw him he was doing some work for the telephone company. Stansfield likewise has not been seen for

some time, but was giving over some time to life insurance work after having left the National Fire Protective Association. Speed Hopkins dropped in early one Monday morning, and is likewise among the vast army. Formerly he was associated with Kidder Peabody here in Boston and since has worked for one of the other investment houses. He is living in Suffield, Conn."

Roger Ward has gathered quite a lot of news since we last heard from him and seems to have done more letter writing than any of the rest of us. "The factory and our home is far enough from Philadelphia so that we seldom see anyone who is passing through, and there are no '25 men in the immediate environs. Ed Collins is quite a frequent caller. He lives in Philadelphia and works for the United States Fidelity and Guarantee Company as safety engineer. We have enjoyed quite a bit of tennis, ping pong, and Bucks County beer together. He corresponds with Haliburton occasionally. Hal is in Detroit, flying in the naval reserve most of the time, I believe, and doing something with or to vacuum cleaners in his spare moments. Archer Nickerson sent me a charming picture of his daughter and I had intended starting a romance by sending him a shot of our boy, but I delayed until I got Diz Doucette's Christmas Card with a picture of his daughter on it, and now I'm stuck.

"One day last fall I was surprised by having Art Ross drop in at the factory. He is in the Air Corps and was stationed at the Middletown Intermediate Air Depot. They do all the major overhaul for the army aircraft in the eastern Corps Areas, which work I should think would be quite interesting. We were going to visit each other with our respective families, and as such things usually go, the plans never materialized.

"I think that Jack Rountree is still down in Glen Ferris, W. Va. He is working on some water power development, I think, but I am not sure of that. I do know that it is about 20 miles to the nearest movies. One day a while ago I was surprised to see Herb Sontag being shown around the factory by one of the engineers. I don't know just what the connection was, but I was glad to see him. He is no longer with the carpet mills in New Amsterdam, but with a similar company in Auburn, N. Y. I think he said he was in the methods department, or probably he was the head of the department.

"Dick Tryon is now in the engineering department of the Standard Oil Company of N. J. I have been trying to get him to come down here from Elizabeth (it isn't very far) but as I recall, he now owes me a letter and as yet has not been down here to see us. With the superhighway across Jersey, it only takes an hour or so to cross the state, and with his new Plymouth he ought to better that time." Roger is production manager at Pitcairn Autogiro Company and apparently is having no trouble in keeping up with the orders, a difficulty we have all encountered.

John Miller writes of his doings in and around Louisville: "I still go to work six days a week and so far they are still paying me a salary. We sell to the street railway companies and you can imagine how much they are buying during these times. I am still able to come and go as I please, having not taken on any boss to tell me what I can do and what I cannot do. I have been trying to get back East to pay the country there a visit, but my travels have been confined to the Middle West and almost every place except the New England States. For the past year I have not been traveling as much as I used to and the regular traveling men have been held confined in the office. Just before Christmas I had to go to Des Moines, Iowa, for several days, and they greeted me with a 15° below day. I intend to try to come East in the summer of 1935 if things are still going then and have not gotten as bad as they looked last summer. That is a long way off and a whole lot of water can go over the dam between now and then, so it is hard to say what I will be doing then. Everything is fine down here, all the banks are open, and the trees and shrubs are all budding, getting ready for a nice spring and summer." Well, John, we are looking forward to seeing you in 1935 even if we have to walk to the reunion.

Your Assistant Secretary has just received a long letter from Frank Klein, XIV, quoted in part as follows: "I have not heard from anyone except Art Ross, who is still a 1st Lieutenant in the Air Corps, and stationed at Middletown Air Depot, Middletown, Pa. I see him every now and then either here (Wright Field, Dayton, Ohio) or in Middletown. He was in Course II.

"I'm still in the same work here, special investigation of fuels and oils for aircraft. Bob Clarke, II, '26 was promoted here nearly a year ago, from test engineer to engineer in charge of all dynamometer tests at the Power Plant Branch. The air-conditioning system I was interested in at Boston was invented by Sam L. Lord, XIII, '28. I enjoyed meeting him very much. While still a student he designed a very good rum-running boat which performed excellently until it was captured a few years later. He later decided it was safer to architect homes. He showed me two very beautiful and unusual ones in Weston, both of which were built for air-conditioning.

"It has been found that knock ratings of fuels vary considerably from summer to winter, and even from day to day due to variations in temperature and humidity. To eliminate this variable, we expect to air-condition the entire laboratory. I might even decide to sleep there on very hot nights."

Your Assistant Secretary is happy to report the arrival of a daughter, Rose Caroline Ware, born January 19. This is the third, the first being a boy, and the second a girl.

Clarence Thulin has returned home from a job he held as casting supervisor (not for George White's Scandals) at the du Pont Cellophane plant at Buffalo. He had

1925 Continued

a serious illness while there, and though completely recovered, has not as yet another connection. He may be reached at 22 Pine Street, Belmont, Mass. Your A. S. also visited Doc, or should we say Professor Foster, at the Mining Department at M. I. T., and among other interesting news told me that he had sent some notes to the last issue of *The Review*.

Your secretaries had a conference the other day during which plans were made to fill vacancies in the line of Course Secretaries, and to investigate the condition of our Endowment Plan Insurance. Any coöperation in either of these matters will be deeply appreciated by us both. — HENRY V. CUNNINGHAM, JR., *Secretary*, 43 Chestnut Street, Boston, Mass. HOLLIS F. WARE, *Assistant Secretary*, 16 Smith Avenue, Reading, Mass.

1926

One of the pleasantest aspects of your Secretary's office is that it is so located that many members of the class frequently drop by. Among recent callers have been: Bill Lowell, who reported having talked with Brad Young in Pittsburgh recently; Jay Goldberg, who lives at Webster, Mass., and is now taking some special textile work week-ends at the Institute; Bob Richardson, who lives in Wellesley; Al Bassett, of New York; and Chippy Chase, of Manchester, N. H. Wes Hemeon and Larry Cumming, both of whom are in Boston, visit the Institute frequently.

It is reported that Guy S. Frisbie was in town lately on business. He lives at Troy, Ohio. Tom Green, of Hartford, reports having had news recently of John Drum, who is Assistant General Manager of the Eastern Michigan System, operating bus, rail, and truck lines. His address is 415 Parker Avenue, Detroit. The Secretary regrets to report that John lost his father in March. Mr. Drum, Sr., was also a Technology man, having graduated in '96.

George Faithfull was married in February to Miss Lucia Frances Turner of Washington and Los Angeles. After graduation he studied law at Fordham University. They will live in New York.

Two engagements have been announced: that of George Leness to Miss Christine Crawford Gibbs of New York, and of G. Malcolm McNeil to Miss Mary Jean Duncan of Winchester, Mass. George will be married this spring. — Ralph Head was recently married but the Secretary has no details. Ken Lord, who is rapidly assuming all the attributes of a Southern gentleman, reports the birth of a daughter, Caryl, on January 19. He has another daughter, Jo Ann, age three. — Edward Newton Roberts is with the American Brass Company at 70 Sayre Street, Buffalo. Bull, it will be recalled, was in South America for several years. — J. RHYNE KILLIAN, JR., *General Secretary*, 11-203, M. I. T., Cambridge, Mass.

1927

COURSE XI

Dr. Allan W. Rowe talked to a group of us in Syracuse in February, and I think you may thank him for his pep talk,

which aroused me from my lethargy. However, there has been very little news floating my way and most of that I have is several months old. Dr. Rowe's visit was quite welcome as he gave us some cheering news about the financial condition of the Institute; for example, that the affairs of the Athletic Association are in such excellent condition that sports will not be curtailed because of the depression; that the Corporation has only a very small deficit for 1932-1933, and even with an estimated loss of 500 students in 1933-1934, it is expected that the entire present deficit of about \$25,000 will be eliminated; that the Institute wishes to hold their present good name and position through the aid of a strong, useful, active Alumni Group, and so on.

An interesting sideline of the meeting was the fact that a young fellow named Eddy '32 received a long-distance call in the midst of the dinner and was offered a job on which he could start work the next day. (Two good indirect results of the meeting: your Secretary supplies some notes and one man gets a job.)

I will supply all the information I have whether old or new, so please excuse anything you already know. During 1932 I received notices of the following marriages: Russ Westerhoff to Matilda Katherine Wychoff, Larry Cheney to Alice Whitmore, George Copeland to Ruth Foljambe, Dick Cheney to Prissa Brinton. We hope that they will please receive our late, though hearty, congratulations. Westerhoff's address is 823 East 23d Street, Paterson, N. J., and Larry Cheney's is 986 Whalley Avenue, New Haven, Conn.

Reggie Jacobs says that he is now a 1st Lieutenant in the Army and in his second year of Law School and going strong. — Paul Ivanvich claims he is a "hotel clerk" at Highland Manor Inn, at Tarrytown-on-Hudson, N. Y. He invites all down to see him at his hotel. — Someone said that Silverman, Silveston, and Sanel were going to Russia to try their luck. We should like to hear from them.

Professor Casey Reynolds lectured in Syracuse a few months ago and stated that John Drisko was assisting him on the Hydraulic Laboratory Research Staff. By the way, John's picture was in the March Review. This concludes the news for this month but I hope you will observe my new street address.

And here's a bit of Course XV news. Ralph and Marjory Stober are proud to announce the birth of a son on March 24, 1933. — LEE MILLER, *Secretary*, 220 Arlington Avenue, Syracuse, N. Y.

1928

Here it is! June 3 and 4 is the date! Our first big reunion is almost here and what a Fifth-Year Reunion it is going to be! It will be held at the world-famous New England Inn, The Toy Town Tavern.

The Tavern, at Winchendon, Mass., (15 miles from Fitchburg and 64 miles from Cambridge) will be reached by special chartered bus service which will connect with the New York-Boston boat for fellows coming up from New York City

and then pick up the rest of the reunion gang at the Institute. Toy Town provides ideal facilities: swimming pool, lake, baseball grounds, special bar rooms with real beer on tap, tennis courts, one of New England's finest golf courses (6,000 yards of real sport on fairways and greens by Donald Ross), the use of the finest rooms, each with private bath and individual porches, and, best of all, meals for two days as only the Tavern knows how to serve them and volumes could be written about those meals.

The Reunion week-end will start from Boston and Cambridge, Saturday, June 3. The crowd will arrive at the Tavern on Saturday forenoon and from then on what a time is in store for '28 reunioners! Eats, plenty of beer on tap, sports of all kinds, poker, roulette — all interspersed with ye goode old bull sessions far into the night. The return to Boston will be made by bus late Sunday and the Committee has made certain that the gang will be more than sorry to leave.

The price? Ladies and Gentlemen, it's like pulling rabbits out of a silk hat. "It's fun to be fooled, but it's more fun to know" that the price is lowest ever — \$12.83 a man, and that's all inclusive! Everything from the time you leave Cambridge until you return. Frankly, the Committee deserves a leather medal for chiseling, for if that isn't a sensational reunion week-end price, then you never heard of one. Even the odd cents figure represents the best of the chiselers' work.

Now '28, it's up to you. Your Committee is headed by that old veteran of foreign wars, Joe Parks, who now lives at 39 Valley Road, Milton, Mass. Write him and say, "Joe, old boy, I'll be there with bells on." Assisting Joe is jovial Theodore Ralph Jope, handling publicity; Jim Donovan, managing the transportation; Bennie Hough, to roll up the beer barrels; Bill Kirk, on sports and program arrangements, and they had some potato peeling, room scheduling, and meal details to handle so that was conferred on ye secretary — all complaints cheerfully received.

In New York we have asked George Palo, Pete Kirwin, Al Dempewolf, Cy Meagher, and Charley Richheimer to get things humming. It's going to be a big time. It's your reunion, the big Five-Year Anniversary. Don't even think of missing it. Bring your tennis racquet, golf clubs, swimming suit, and a big smile.

Further information was mailed to everyone early in April. Don't put it aside, write now, let's have your support. Drop a line to your special cronies and see that they come, too. Remember, the date June 3 and 4. We'll see you at the Toy Town Tavern, Winchendon, Mass. It's the only Fifth-Year Reunion you'll ever have! — GEORGE I. CHATFIELD, *General Secretary*, 420 Memorial Drive, Cambridge, Mass.

COURSE I

Two months ago, I encroached on the news of Mike Cohen, Secretary of Course XI. This time I'm going to encroach more seriously, even to the point of an-

1928 Continued

nouncing the birth of Michael Cohen (not Jr. to those who know Morris) early in February. Mike and family are living at 2115 Quentin Road, Brooklyn, N. Y.

The story of Bill Beard and his robot induced Klegerman to write directly for further news and now I am able to add to the previous story. Bill spends only an hour a day at his task of teaching government to the students at California Tech. and devotes the rest of his time to whatever pleases him most. He dashes busily about the campus in an Austin; he has his own plane and pilot's license; and to complete his conquest of land, air, and water, he has utilized empty gasoline drums and built himself a diver's suit in which he explores the floor of the calm Pacific.

Hank Lamb writes that he has been working for the Liberty Mutual Insurance Company for a little over a year now. "They call me a safety engineer, but the work has very little to do with the theory of structures. Most of my work is taken up with industrial accident insurance to cover the provisions of the Workmen's Compensation Acts of the various states. Part of the time I act as the eyes of my company, looking over plants to see if they would consider them good business. The rest of the time I spend trying to prevent accidents in the plants they insure. Like all other salary jobs at the present time they find enough to keep me busy." Hank is still single and can be reached at Box 22, Fitchburg, Mass.

Chuck Topping has been in Persia for several months on construction of the Southern Persia Railroad. (I cannot guarantee the exactness of the name and Bob Cook, from whom I received this information, was unable to remember the long address at which Chuck might be reached.) He writes, however, that living conditions are better than he experienced in Venezuela, and Cook says the latter were all right, so Persian climate is apparently not absolutely ruinous.

The latest available address for Ed Holmes is Fifth Floor, Old South Railway Building, 13th and Pennsylvania Avenue, Washington, D. C. We assume that he is still with the Bureau of Public Roads. — GEORGE P. PALO, *Secretary*, 426 East 238th Street, New York, N. Y.

1929

The 1929 class news of the month is about to become public. Of course, if you all followed my oft-repeated suggestion to drop a line about your activities, there would be more news. Due to so many 1929 men starting off the New Year by writing a line or two, we had some interesting reading in the March Review. Let's not wait until the next New Year to repeat that performance. Tell us whether you are one of the lucky job holders.

Hank Gibbons, II, and Hal Dick, II, are still turning out airships for the Goodyear Zeppelin Corporation, but they're wondering, along with the rest of the Zeppelin Corporation staff, where they'll be when the *Macon* is finished, for

commercial airship construction will not be started until Congress enacts legislation that will guarantee the ocean-going airships mail contracts on the same basis as steamships. The airship industry depends on legislation to that effect, but Congress, in spite of the possibility of saving or creating an industry of considerable value to the country, seems to take little active interest in giving an industry encouragement that would cost the government nothing.

Johnny Hartz, X, Gene Gilman, X, are still working in the chemical engineering division of Goodyear Tire and Rubber Company. Their work is mostly in the manufacture of chemicals of various kinds used in the rubber industry. They are working as much as any of us in the Goodyear Company and are enjoying their work while waiting for things to get better.

Of course I'm still working in the development department of Goodyear on tire development. It's extremely interesting work, but like most jobs these days it doesn't suffer from great prosperity.

By the way, Technology '29 men are quite active around Goodyear. At present a Goodyear Handball Tournament is being organized and of the six divisions, three are represented by three of the above-mentioned '29 men on the organizing committee of six. Hal Dick represents the players from the Zeppelin Corporation. Johnny Hartz represents those from Goodyear Plant I, while I represent those from Plant II. The results will show these same men either at the top or close to it in both the play in their own divisions and in the final Goodyear-wide Tournament.

Another pair of our classmates are secretaries of their respective local Technology Clubs. Erling S. Mathiesen, VI, is the Secretary of the Technology Club of Milwaukee. Edwin R. Gardner, VI-A, is Secretary of the Technology Club of Schenectady.

Len Peskin, XVII, writes as follows: "The last I saw of Jerry Geisman was about three or four months ago when Jerry came to Boston on a business trip. Jerry tried the newspaper game for a while, editing a small uptown newspaper in New York. Lack of advertising killed that venture, so Jerry has been trying the wholesale leather game with his uncle as a partner.

"Hunter Rouse is back from Germany with Frau Rouse, as interesting a person as you'd want to meet. Hunter is in the Hydraulic Laboratory doing research. The Rouses are, along with ourselves, members of a little group of married instructors, which meets socially on frequent occasions.

"Bob Philippe is working part time as an unemployed Technology graduate in the Soil Mechanics Laboratory. He sends his regards.

"Your fraternity brother, H. Charles Pease, is visiting us tonight, thus preventing my attending an Alumni Council Meeting. The Peases are doing quite well and Charlie is one of the fortunate possessors of a good position."

As you probably remember, Len is an instructor in the Building Construction Department at the Institute and I gather from his letter that he, too, is married. Write again, Len, we're glad to hear about the boys around Boston. — EARL W. GLEN, *General Secretary*, Box 178, Fairlawn, Ohio.

1930

COURSE VI-A

I was partly wrong when I intimated in these notes not long ago that George Theriault was in Lynn, Mass. I have just received a very welcome and newsy letter from Terry and find that he is now located in Philadelphia. However, his heart is still in Lynn. To prove the preceding statement I have the following announcement to make: It is with great pleasure that we announce the engagement of George I. F. Theriault and Miss Dorothea Melanson of Lynn. Can't some of the other bachelor members of this course follow Terry's excellent example?

As it had been rumored, Theriault has had a wide variety of jobs since he left the Institute. He has had some experience with electrical appliances, done some research for an airplane company, been a control operator for the Shepherd Broadcasting Service (WNAC-WAAB), and finally left radio to go with the High Tensile Division of the E. G. Budd Manufacturing Company in Philadelphia. The company manufactures all kinds of stainless steel structures, principally rail cars at the present time. Terry's work is in the research laboratory conducting research on "shotwelding" stainless steel. Terry informs me that "shotwelding" is a highly controlled spotwelding and is a development of his company. Terry likes the work and finds it very interesting.

Theriault recently visited Granger Schrader, who is working for the Philadelphia Electric Company and reports that Granger is a very proud father and incidentally that his wife is one swell cook.

I was pleased to learn that our Course baby, Granger, Jr., has had his weight plotted day by day by his father as long as he was weighed. Such engineering practices deserve publication. I think the equation of that weight-curve should be obtained by Granger, Sr., and firmly written in the records of this Course for posterity to admire and attempt to decipher.

I certainly appreciate getting all this news from Theriault. Perhaps some of the other members will take the gentle hint and remember that this is a coöperative column about a coöperative course. Wanny has got the right idea, too. In the short space of three weeks I received two letters from him. He has been playing tennis and golf lately in the sunny South. All is not play for Wanny though. He is brushing up on his math in a very thorough style at Duke University.

Prendy recently spent a week-end with the Burleys in Philadelphia. I hear that Saturday night a bridge game started that was still going at four A.M. the next morning. That sounds like a terrific pace. Frank Burley writes me that he can

1930 Continued

still brag of a 100% church attendance record for the year 1933. I'll bet it was hard to turn out the Sunday Prendy was visiting him.

My status remains the same except for the fact that I am in the market for a roommate. — EARL E. FERGUSON, *Secretary*, 60 Eaton Place, East Orange, N. J.

1931

Was so surprised to hear from men in three of the courses that words fail me, which is probably all right with a lot of people. For this reason, I will confine these notes to what the boys have sent in to me. Nels Haskell, whose notes appear below, says in a letter: "It is hard to realize that almost before I know it school will be over again, probably for good. But I am thinking seriously of getting a job, which will be a welcome substitute." We wish Nels all the luck in the world in finding the substitute. Below, also, are notes about Course III, which Bob Backus sent in to us. Bob is still roustabouting for the Phillips Petroleum Company at Canton, Kansas. There does not seem any likelihood of advancement in the near future, although on the whole the oil business shows sign of improvement. More importance is being attached to the Kansas fields, new men being employed by the Phillips Company daily.

The third course from which I heard was Course VI in the form of a letter, which read as follows: "After missing news of Course VI for many months, I thought that I would give you what little I know about the fellows. R. N. Vanderwarker has been employed off and on in Taunton's largest cotton mill, but is now studying commercial photography and expects to establish a small studio sometime. Frank Zwicker is connected with the National Economy League in Boston. Cliff Harvey is in partnership with Paul Hendricks, formerly on the Round Hill staff of M. I. T. in Hartford. They are building custom-built amateur radio apparatus. I don't know how successful they are. John Hollywood is among the unemployed. He was in New York some time ago looking for a job. Fred Elser and his bride returned from the Philippines last September and are living in Carlsbad, Calif. While waiting for a job as RCA radio engineer, he is teaching a high school radio course. He is also in partnership in a radio store near Carlsbad and is handling hundreds of radio messages from the Philippines. In his spare time, he helps raise avocados and other fruits, and is learning something about the newspaper business from his father-in-law's paper. I am also unemployed and spend my spare time operating my amateur radio station and just loafing. If I haven't a job by next summer, will move with my family to Texas. Hope this helps in your monthly class report in *The Review*." This letter was sent in by Roger Wilson and we appreciate receiving it and wish Roger luck in finding a job.

I find that Bob Backus has enclosed in his Course III notes some items of general interest, so I am taking the liberty of

putting them under the general heading. "I met Elliot Middleton, XB, in Dallas. At that time he had finished constructing a refinery in the East Texas Field, and was mapping another field near Dallas. At the same time I saw Earl Cullum, VI. He was recovering from a fractured spine in the Dallas Fracture Hospital. He is radio installation engineer for the United Airways. His injury occurred while connecting up some of their equipment. Also met Tommy Rosborough, XV, in Tulsa. He is general superintendent of the Forrester Mill of the Caddo River Lumber Company and in charge of sales in Western Arkansas and Eastern Oklahoma. Seemed very enthusiastic about the future of the lumber business in general and the Caddo Lumber Company in particular. He is certainly holding down a big job. Buck Bassinger, VIA, has stopped making generators out of wind mills and is now working on diesel engines and coal separators at Wilmington, Del."

The last news from Lincoln Gifford contained the information that he was moving Maine earth to Illinois prior to planting a garden. He is working for the Illinois Zinc Company at Peru, Ill.

Vivian is now back in Burma, where his address is Mawchi Tin Mines, Ltd., Mawchi, Via Toungoo. His job there is chief surveyor and general assistant, which includes looking after roads and mine machinery. They are understaffed just now, and consequently Vivian is kept pretty busy. Their most recent excitement has been a couple of strikes. Kurkah labor is used almost exclusively underground, and the laborers took it into their heads to start these strikes. The last one was quite serious, so that it was necessary to call in the Military Police, and it was really touch and go with the officials during the interval before the police arrived. They reported in record time of five days from the nearest outpost, and after their arrival it did not take them long to clean up the situation, so that the natives are now at work again and quite peaceful. The whole root of the trouble was the world depression, which resulted in too many unemployed natives in the camp.

Don (Alkali) Herbert is studying at the Colorado School of Mines. Seems to like it very much. He has organized the Double Eagle Gold Mining Syndicate. With the name all decided upon, which he admits is perfectly "swell," he is now looking for a property to work. — Johnny Johnson is still on the job as an Assistant in the Mining Department at the Institute.

Hope that the contributions by these men this month will prove an impetus to some of the other men to write in the news that has come their way. Till next month — JOHN M. MACBRAYNE, JR., *General Secretary*, Room 1-181, M. I. T., Cambridge, Mass.

COURSE I

The following tidbits are culled from the *Chi Epsilon News Letter*, without permission:

THE TECHNOLOGY REVIEW

Smedley D. Butler, Jr., is working as an assistant engineer for the Peter and A. J. Ellis Construction Company of Philadelphia, engaged in laying a cast iron water main. — Hank Childs is with the engineering department of the City of Waltham, Mass., supervising the sewer and water main construction as part of an unemployment relief program. — Don Holden finally finished his master's thesis, and writes: "I am, of course, unemployed and having a swell time of it. I really think the poor unfortunate people who have jobs should be jealous of me because I am having such a lot of fun! (By the way, Brother, can you spare a dime?)" — Buck Moody was East last fall after a fall in one of the tunnels at the Hoover Dam — sick leave with pay, you know. Refuses to comment on the project as every issue of an engineering publication has more about it than he can see from his little corner of the job. — Charlie Steinbach has conducted much research into the art of loafing and now proposes to publish that long awaited tome, "How to Loaf." — Dan Lobo-Guerrero is building a road in the southern part of Colombia which is to connect the Pacific Ocean with a port on the Putumayo River. He has charge of 27 miles of road in the middle of the jungle, and is delighted with the experience he is getting. — Chik Lam was married May 21, 1932, still wants a job, even to the extent of being willing to come back to the United States.

News of the others in Course I will be appreciated, and should be sent, until about June 1, to the address given here. — NELSON B. HASKELL, *Secretary*, D-43 McCulloch, Soldier's Field, Boston.

COURSE III

Buzz Breitenstein is working in the engineering department of the Philadelphia and Reading Coal and Iron Company. According to the latest information received, he is at present known as Breitmeyer. He worked up a paper on the future of fuels, which was based on his research work at the Institute, and this paper was presented under the joint authorship of Professor Hutchinson and Breitenstein at the A. I. M. E. meeting in New York in February.

Dip Depoyan seems to have left the mining fold for a more remunerative profession, that of making jig-saw puzzles. — Marvin Egleston writes that he is about to get his master's degree in Mechanical Engineering at Tech. After that he expects to return to Alaska and mine gold, if he can find the gold.

Norm Fitzgerald expects to get his degree of doctor of science at the Institute, and following that, to look around for newer and better degrees. — Tony Frank, when last heard of, was recuperating from tuberculosis at the Boston State Hospital. At that time he expected to be kept in for several months more.

Lee Gibbs writes that while working for the Reading Iron Company he has already attracted attention of the officials. One, on seeing him in an office,

1931 Continued

inquired, "Who let that tramp in?" He is doing research on the gas produced in a blast furnace.

Last news of Mulliken was that he was moving landscape for the New York Park Commissioner. — Jack Sherman writes that he has been working as contract miner in the Bear Valley Colliery of the Philadelphia and Reading Coal Company. Lately, however, we have learned that he has joined the American Cyanide Company in New York City. — R. S. BACKUS, Secretary, Box 114, Canton, Mass.

1932

I imagine that you fellows are wondering why there isn't more news about our class in *The Review*. If you wouldn't drop the matter there, but would ask yourself whether or not you have contributed any, there would certainly be a great influx of news. How about it? As soon as you have finished this, write a newsy letter to your Course Secretary or me. Remember that this set-up of a General Secretary and a Secretary for each course is only to facilitate the gathering and dispensing of news about you and your friends. If you are in touch with three or four of the gang, write me about what they are doing and I will see that it gets printed.

Carroll Wilson contributed the following notes: "There being a great dearth of class news, Chippy has inveigled me into writing the following brief account. It is a pleasure to contribute a bit of news to the class column, if only because I can bring to your attention the activities (or inactivities) of our honorable Secretary, Chase. He is leading a life of leisure and contentment in the Halls of Learning up the river. Incidentally, he is still beating a path to the gate of Wellesley.

"Other embryo financiers and industrial executives at the Business School are Bud Imray and Tom Jenkins. Bud is in Cambridge between week-ends in New York. You may have seen the announcement of his engagement to Kay Stanton of New York, Wheelock '32. Tom has recently become a recluse. Apparently he is communing with the spirits of high finance, although I really believe that it is his intensive training for squash that has taken him out of the gay social whirl.

"Jack Kimble finished the work he had been engaged in here in the ceramics laboratory about a month ago and is now in Rochester, employed, I trust. Tom Rhines cannot resist the lure of Boston and we are favored with his visits at least once a month. He is assisting the United Aircraft Company at Hartford in the solution of their research problems, and we confidently expect him to make outstanding contributions to the industry.

"Jack Kelton is thoroughly immersed in the Law. His speech has the unmistakable characteristics of members of the legal profession. Undoubtedly, we shall hear in due time of his appointment as a C. J.

"This being the 59th minute of the 11th hour before this is due, the dead line is staring me in the face. I trust you will overlook any literary shortcomings

of this brief account; I assure you I shall try to do better in the future." — CLARENCE M. CHASE, JR., General Secretary, Chase D 33, Soldiers Field, Boston, Mass.

COURSE I

Another man in our course has scored a knockout over Old Man Depression. Mr. (we call him mister now that he is among the *élite*) Minot Bridgman is the lucky one this time. He is working in the Actuarial Department of the Metropolitan Life Insurance Company in New York. Shellard, I, '31 is working in the next office to him. Bridge hasn't given up civil engineering though, for he is attending the Brooklyn Polytechnic Institute at night and working there for his master of science degree. Soon we shall hear the peal of wedding bells from his direction. Good luck! — I don't remember whether I told this before: Hap Phillips is applying his profound knowledge of science to the art of milking cows on Cape Cod. Those cows must feel honored! — ROLF ELIASSEN, Secretary, 225 Orchard Street, Belmont, Mass.

COURSE III

A little information about Course III men has been accumulated. A long letter from Orne arrived in the middle of March in which he tells about his trip to China, and some about China also. He sailed from Vancouver, B. C., having gone through Colorado and Seattle en route. He arrived in Hong Kong on August 19, and left two days later for Canton, where he is now.

He does not have any work as yet, as a political shift canceled a job for which he was listed when he left Boston. He is doing some studying, and also some horseback riding, tennis, and so on. He is another of the fortunates to get his name in print by having written an article on a large bridge being erected in China.

Every modern convenience can be had except illuminating gas. He describes it as "parts of the West set in an Eastern atmosphere." Gasoline sells at \$1.70 a gallon, although cars can be hired for \$3.00 an hour, including chauffeur. Shaeffer fountain pens sell normally around \$60 per, although they may be bought for \$25 on New Year's Eve on the Chinese Calendar if the shopkeeper has some large debts to be paid before the New Year. It costs more to see a show from the balcony than from the orchestra, and the nearer the stage, the cheaper the seats. Speaking of shows, he attended a movie back in January in which there were Pathé News events before the feature. Among them was a section showing the sophomore-freshman glove fight at Tech last fall! And there are still some who say that the world is a big place! He asks me to pass on to you all the wish that the prosperity corner is not very far away, provided you have located it at all.

A letter from Kelly reports his having landed a job with the American Oil Company of Massachusetts about the first of the year. Not a bad Christmas present.

The company is connected by a series of vertical combinations with the Standard Oil Company of Indiana. Kelly is well up in the organization in an executive capacity and likes his job very well. He claims to have put the depression to good use by improving his golf game. He has found by playing in the fairway instead of the rough that overhead in spare golf balls is greatly reduced. We knew his B.S. would help him.

I saw Haynes at the annual meeting of the A. I. M. E. in New York in February. He was busy running down various people, but he has not reported any success as yet in being placed with any of them. — I hear Johnson is working for a grain and feed company, but have no details. Also that Demas had a job for a while in New York, but had to give it up.

Out of 22 in our class, eight report having or having had jobs since June, although there are many of whom I have heard nothing. Of these, five, so far as I know, are still on the same job. — HENRY J. CHAPIN, Secretary, 101 Ardmore Avenue, Ardmore, Pa.

COURSE IX

At last a letter and something to write about in Course IX. And before anything else is said, how about some more letters from you in this most honorable course? You can't write about people unless you know something, so how about helping out? After all it's your course, too.

Had a great letter from Carl Wahlström who is working as assistant on the Differential Analyzer machine at M. I. T. Frank Gowen is working there with him. Carl seems to have traveled a bit before getting this job, having been on a three months' trip to South America and back. He seems to have seen quite a good deal of Argentina, Uruguay, and Brazil. Now why couldn't we find an uncle to take us on such a trip? He sure was lucky. — The only others we know about right now are Dick Huessener who is still drinking beer in Munich (and studying at the University) and Al Newcomb, who is doing the Harvard Business School. — Well, see you all later, but in the meantime, how about some news? — ALMER H. ORR, JR., Secretary, 604 Pitcairn Place, Pittsburgh, Pa.

CLUB NOTES

(Concluded from page VII)

Technology Club of Kentucky

On Friday, March 24, we had a very enjoyable evening with Dr. Tryon. On account of the short notice of the meeting given to the various members, the gathering was not a large one. The following were present: Messrs. Coupe, Haberer, Perry and son, Clark, Rash, Sacks, Breitbeil, Hancock, and our guest, Dr. Tryon. One item of business was the reelection of Thomas D. Perry and James R. Hancock as President and Secretary, respectively.

—JAMES R. HANCOCK '24, *Secretary*, McDonnell and Miller, 328 Breslin Building, Louisville, Ky.

Technology Club of Hawaii

The annual meeting of the club was held on March 21, and at that meeting a new slate of officers was presented, with the result that the officers for the ensuing year are as follows: Professor C. B. Andrews '28, President; Harry P. Field '21, Vice-President; Sidney T. Carr '06, Secretary-Treasurer; and Dudley Smith '28 and

Ralph Johnson '27, Directors. —SIDNEY T. CARR '06, *Secretary*, Hawaiian Electric Company, Honolulu, T. H.

Indianapolis Association of the M. I. T.

It was a pleasure to have Dr. Tryon with us in Indianapolis again on Monday, March 27. He put in a rather busy day with our President, J. Lloyd Wayne, visiting various schools, and then met at dinner with 11 of the local M. I. T. men at the Sheffield Inn. He told us about the

various new experiments being conducted in Admissions, and he was plied with questions regarding various matters back at the Institute. The following men were present at the dinner: R. L. Berry '30, W. W. Bonns '99, E. M. McNally '18, H. A. Scherrer '03, W. M. Taylor '86, L. P. Brezinski '29, W. J. Daniels '13, F. F. Lange '23, M. Mitchell '28, J. W. Stickney '96, and J. L. Wayne '96. Alumni traveling in this vicinity are cordially welcomed. —EDWIN M. McNALLY '18, *Secretary*, The Barbasol Company, P. O. Box 1178, Indianapolis, Ind.

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